

North Row Development

New Construction
6780 Old Orion Court
Rochester Hills, MI 48306

Client:
 North Row, LLC.
 720 Kimberly Drive
 Troy, MI 48078

Project:
 New Construction
 6780 Old Orion Court
 Rochester Hills, MI 48306

General Scope of Work

1. New construction of 5 multi-family apartment buildings
2. General site improvements

Owner
 North Row, LLC.
 720 Kimberly Drive
 Troy, MI 48078

Architect
 Krieger | Klatt Architects Inc.
 (Jeff Klatt, R.A.)
 2120 E. 11 Mile Rd.
 Royal Oak, MI 48067
 P:248.414.9270 F:248.414.9275

Civil Engineer
 Nowak & Fraus Engineers
 (Brett Buchholz, P.E.)
 46777 Woodward Avenue
 Pontiac, Michigan 48342
 P.248.332.7931

General Sheet Index

Sheet No.	Title
G.001	Cover Sheet
G.002	Code Analysis

Civil Sheet Index

Sheet No.	Title
T1	Boundary / Topographic / Tree Survey
C1	Overall Site Plan
C1A	Emergency Vehicle Access Plan
C2	Demolition Plan
C3	Paving & Grading Plan
C4	Utility Plan
C4A	Storm Water Management Plan, Details, and Calculations
C5	Soil Erosion and Sedimentation Control Plan
C6	Notes and Details (1 of 3)
C7	Notes and Details (2 of 3)
C8	Notes and Details (3 of 3)
L1	Tree Preservation Plan
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Electrical Sheet Index

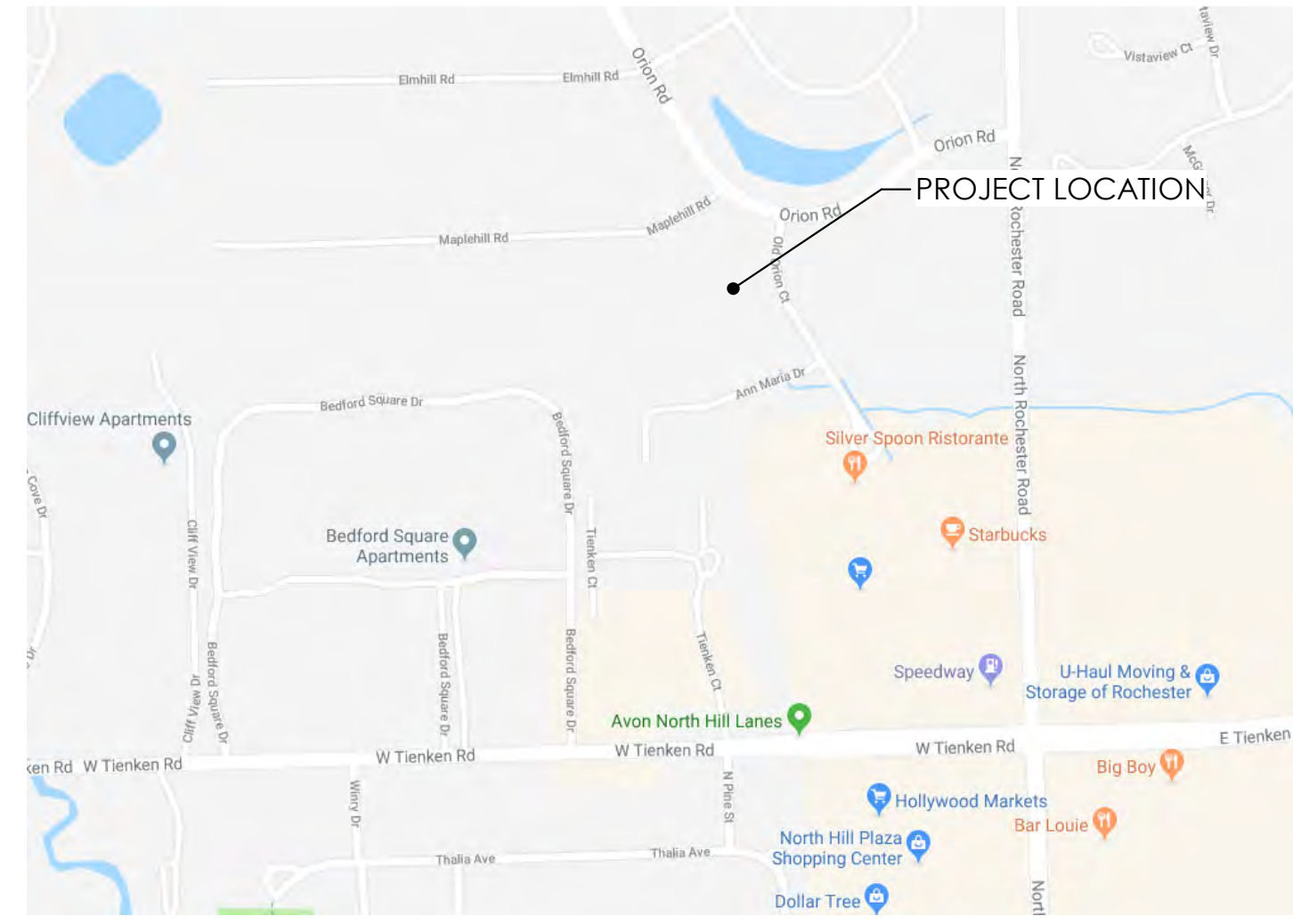
Sheet No.	Title
ES.100	Site Lighting Plan - Photometric
ES.101	Site Lighting Plan - Details

Architectural Sheet Index

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A.100	First & Second Floor Plan (Buildings A-D)
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A.200	Exterior Elevations
A.201	Exterior Elevations
A.202	Exterior Elevations (Building E- Partial)
A.300	Site Details
A.301	Enlarged Amenity Area Plan
A.302	Enlarged Amenity Area Plan - Gardens
A.400	Exterior Renderings
A.401	Exterior Renderings



North
 Aerial Map
 NTS

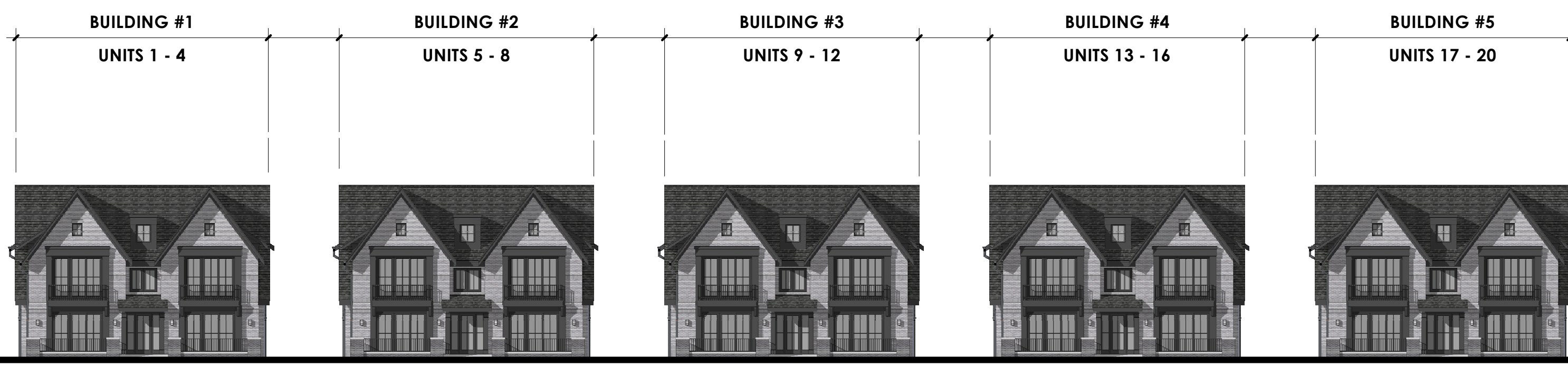


North
 Location Map
 NTS

Signage:
 All signage to meet Chapter 134 of the city code of ordinances and be approved under a separate permit issued by the City of Rochester Hills, MI. Signage has not been included within this submittal.



View from Old Orion Ct.



Building Key Plan
 1" = 40'-0"

Issued	Description	By
11.21.2018	Concept Plan	
04.26.2019	PC Discussion Item	
10.31.2019	PC - SPA	
02.11.2020	PC - SPA (Rev. 1)	
04.01.2020	PC - SPA (Rev. 2)	
10.22.2020	PC - SPA (Rev. 3)	

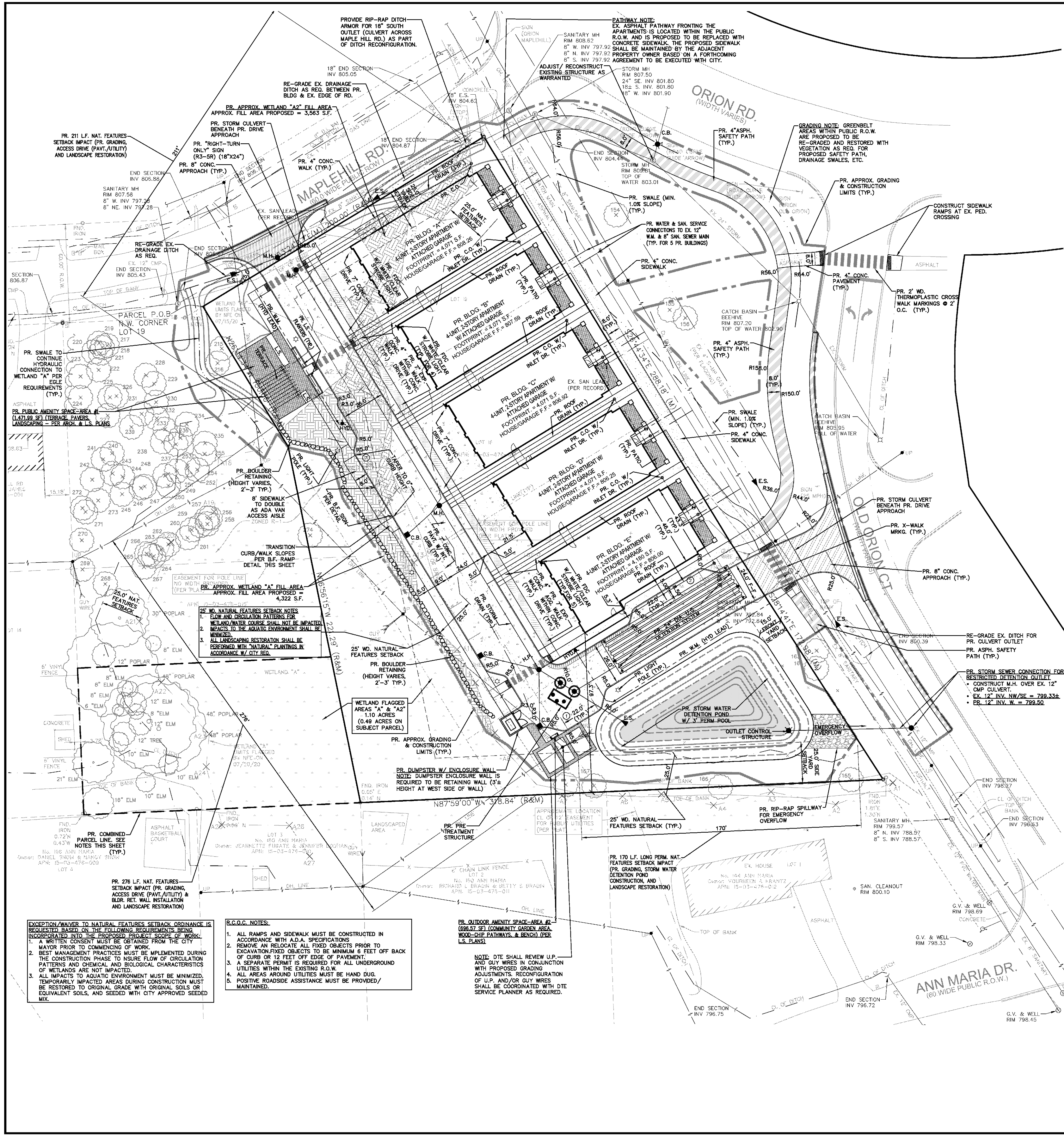
Seal:



Note:
 Do not scale drawings. Use calculated dimensions only. Verify existing conditions in field.
 North Arrow:

Sheet Title:
 Cover Sheet

Project Number:
 18-101
 Sheet Number:
G.001
 City File Number
 19-042, Section #3



SITE SUMMARY

SITE ADDRESS : 6780 OLD ORION CT., ROCHESTER HILLS, MI 48306
 SITE PARCEL I.D. : 15-03-476-016
 SITE GROSS LAND AREA : 104,978.60 S.F. OR 2.41 ACRES
 SITE ZONING : FB-1 (FLEXIBLE BUSINESS OVERLAY)
 REQUIRED MINIMUM BUILDING SETBACKS:
 FRONT = 15'
 SIDES = 25'
 REAR = 50'
 PROPOSED MINIMUM BUILDING SETBACKS:
 FRONT = 15'
 NORTH SIDE = 15' (P.C. APPROVAL REQ.)
 SOUTH SIDE = 37.3' (MIN. PROVIDED)
 REAR = 95.70'
 MAX. BUILDING HEIGHT PERMITTED: TWO STORES OR 30'
 PROPOSED BUILDING STORES & HEIGHT: TWO STORES, 30' HEIGHT
 PROPOSED BUILDING FOOTPRINT:
 FOOTPRINT EACH BUILDING (A, B, C, D, E): 4,071 S.F., BUILDING E: 4,180 S.F.
 TOTAL BUILDING FOOTPRINT = (44,071+4,180) S.F. = 20,464 S.F. OR 0.47 ACRES
 BUILDING LOT COVERAGE: 0.47 AC / 2.41 AC = 19.50%

PARKING CALCULATIONS

PARKING REQUIREMENTS
 1.5 PARKING SPACES REQUIRED PER EACH DWELLING UNIT.
 TOTAL DWELLING UNITS = 5 BUILDINGS * 4 UNITS PER BLDG. = 20 UNITS
 TOTAL REQUIRED PARKING = (1.5 SPACES PER UNIT * 20 UNITS) = 30 SPACES
 TOTAL PROVIDED PARKING = 50 SPACES
 BREAKDOWN OF PROVIDED PARKING:
 • 4 COVERED SPACES WITHIN GARAGE OF EACH OF THE 5 PROPOSED BUILDINGS = 20 COVERED SPACES
 • 4 EXTERIOR SPACES WITHIN DRIVEWAY OF EACH OF THE 5 PROPOSED BUILDINGS = 20 EXTERIOR SPACES
 • 10 EXTERIOR SPACES (INCLUDING 2 BARRIER-FREE, VAN ACCESSIBLE SPACES).

GENERAL SITE PLAN NOTES

ALL WORK SHALL CONFORM TO APPLICABLE STANDARDS, SPECIFICATIONS, AND REQUIREMENTS FROM THE CITY OF ROCHESTER HILLS, OAKLAND COUNTY WATER RESOURCES COMMISSIONER, ROAD COMMISSION FOR OAKLAND COUNTY, AND MICHIGAN DEPT. OF ENVIRONMENTAL QUALITY.
 SEE ARCHITECTURAL DRAWINGS FOR ADDITIONAL BUILDING INFORMATION, AND LANDSCAPE DRAWINGS FOR ADDITIONAL LANDSCAPE INFORMATION.
 ALL RADIAL DIMENSIONS SHOWN ARE TO PROPOSED BACK OF CURB, EDGE OF PAVEMENT OR EDGE OF SIDEWALK.
 PROPOSED WATER MAIN, INCLUDING HYDRANTS, SHALL BE A PUBLIC UTILITY TO BE SITUATED WITHIN A 20' WIDE PUBLIC EASEMENT (WHEN LOCATED ON PRIVATE PROPERTY), PER CITY OF ROCHESTER HILLS REQUIREMENTS.
 LOCATIONS FOR PROPOSED GAS, ELECTRIC, U.G. COMMUNICATIONS AND OTHER FRANCHISED UTILITIES SHALL BE CONFIRMED UPON COORDINATION WITH SERVICE PROVIDERS/PLANNERS.
 A SOIL EROSION AND SEDIMENTATION CONTROL PERMIT IS REQUIRED THROUGH THE OAKLAND COUNTY WATER RESOURCE COMMISSIONER'S OFFICE. ALL SOILS SHALL BE CONTROLLED AND CONTAINED ON SITE THROUGHOUT THE COURSE OF THE PROJECT.

PERMIT NOTES

REVIEW AND/OR PERMITTING IS REQUIRED FROM THE FOLLOWING AGENCIES:
 SOIL EROSION, D.C.W.R.C.
 WETLAND USE PERMIT: MI EGLE & CITY OF ROCHESTER HILLS
 PUBLIC WATER MAINS: CITY OF ROCHESTER HILLS/D.C.W.R.C./MI EGLE
 STORM DRAIN & STORM WATER DETENTION: CITY OF ROCHESTER HILLS
 PUBLIC R.O.W. (UTILITIES & PAVING): R.C.C.C.

SIGN NOTE

ANY FUTURE GROUND SIGNS PROVIDED SHALL REQUIRE A SEPARATE SIGN PERMIT & APPROVAL THROUGH THE CITY OF ROCHESTER HILLS.

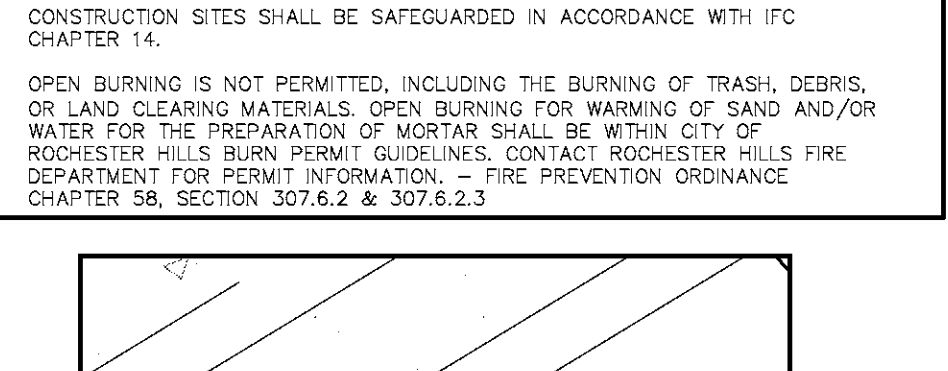
PROPOSED LOT COMBINATION NOTES

THE PARCEL 15-03-476-016 IS PROPOSED TO BE COMBINED WITH PART OF NEIGHBORING PARCEL 15-03-476-015
 EXISTING PARCEL (15-03-476-016) AREA: 90,529.37 S.F. OR 2.08 ACRES
 PROPOSED PARCEL (15-03-476-016) AREA: 104,978.60 S.F. OR 2.41 ACRES

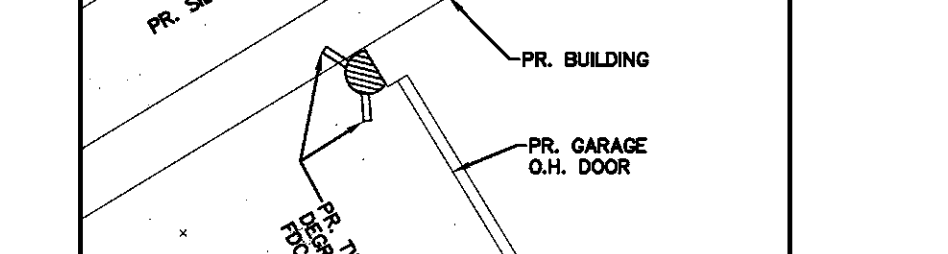
FIRE DEPARTMENT NOTES

FIRE LANES SHALL BE DESIGNATED BY THE FIRE CODE OFFICIAL, AND SHALL BE CONSPICUOUSLY POSTED ON BOTH SIDES OF THE FIRE LANE, WITH FIRE LANE SIGNS, SPACED NOT MORE THAN 100 FEET APART. FIRE LANE SIGNS SHALL READ "NO STOPPING, STANDING, PARKING, FIRE LANE", AND SHALL CONFORM TO THE MICHIGAN MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.
 PROVIDE A WHITE/CLEAR STROBE LIGHT OVER EACH FIRE DEPARTMENT CONNECTION.
 PROPOSED BUILDING CONSTRUCTION TYPE: 5B (FOR ALL BUILDINGS)
 TOTAL APPROX. BUILDING SQ. FOOTAGE: 20,464 S.F. (BUILDINGS A,B,C,D,E)
 THE CONSTRUCTION TYPE AND SQUARE FOOTAGE OF BUILDING REQUIRE A FIRE FLOW OF 2000 GPM AND A MINIMUM OF 2 FIRE HYDRANTS, WITH AN AVERAGE SPACING OF 450 FEET.
 A KNOX KEY SYSTEM SHALL BE INSTALLED, IN A LOCATION APPROVED BY THE FIRE CODE OFFICIAL. ORDERING INFORMATION IS AVAILABLE FROM THE KNOX COMPANY AT KNOXBOX.COM.
 F.D.C. LOCATIONS SHOWN ARE LOCATED AT BUILDINGS PER FIRE DEPARTMENT REQUIREMENTS.
 CONSTRUCTION SITES SHALL BE SAFEGUARDED IN ACCORDANCE WITH IFC CHAPTER 14.
 OPEN BURNING IS NOT PERMITTED, INCLUDING THE BURNING OF TRASH, DEBRIS, OR LAND CLEARING MATERIALS. OPEN BURNING FOR WARMING OF SAND AND/OR WATER FOR THE PREPARATION OF MORTAR SHALL BE WITHIN CITY OF ROCHESTER HILLS BURN PERMIT GUIDELINES. CONTACT ROCHESTER HILLS FIRE DEPARTMENT FOR PERMIT INFORMATION. - FIRE PREVENTION ORDINANCE CHAPTER 58, SECTION 307.6.2 & 307.6.2.3

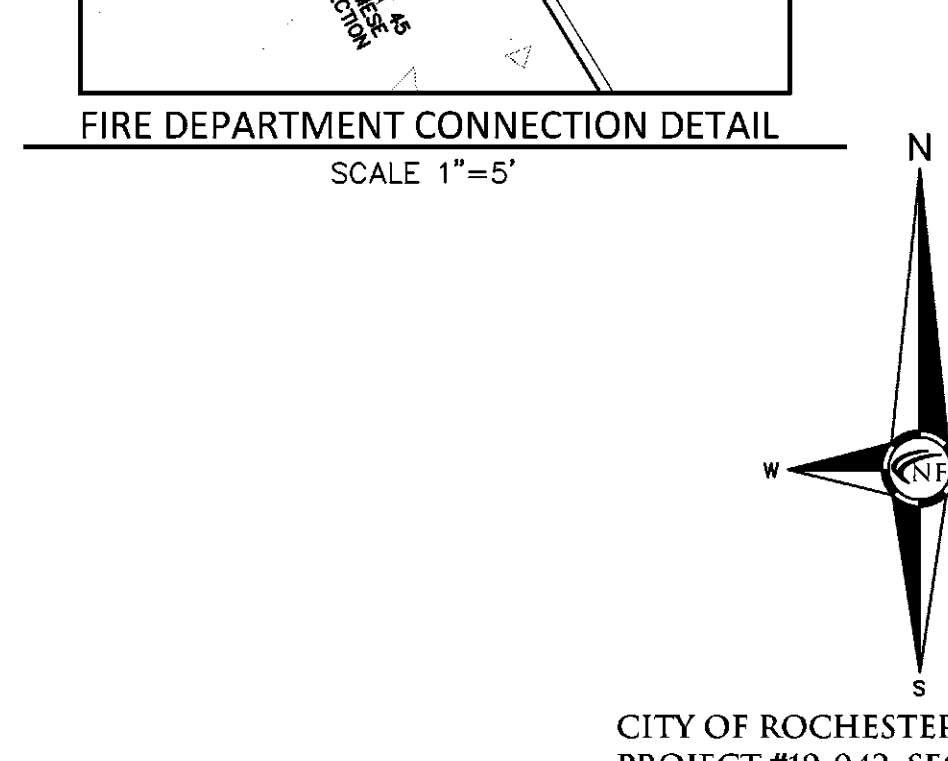
GENERAL PAVING LEGEND



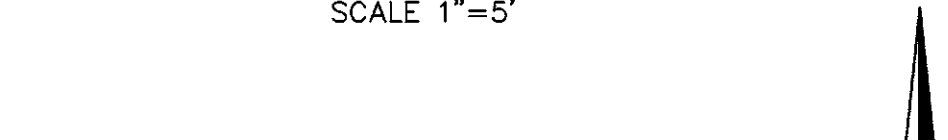
GENERAL LEGEND



LEGEND



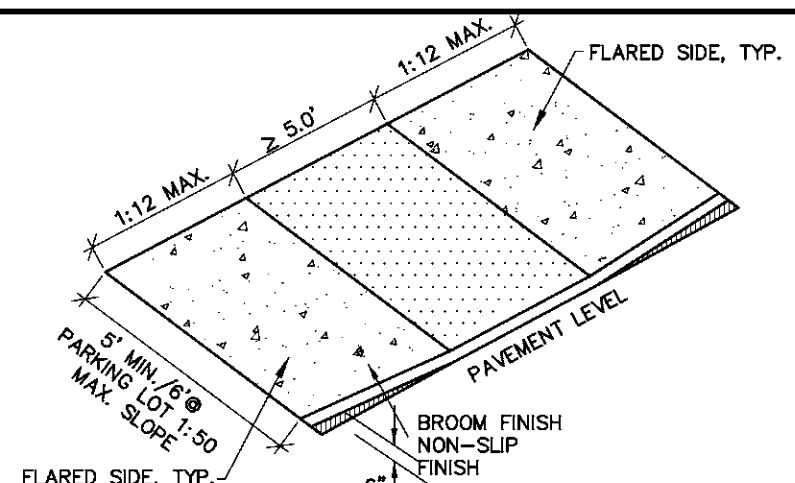
FIRE DEPARTMENT CONNECTION DETAIL



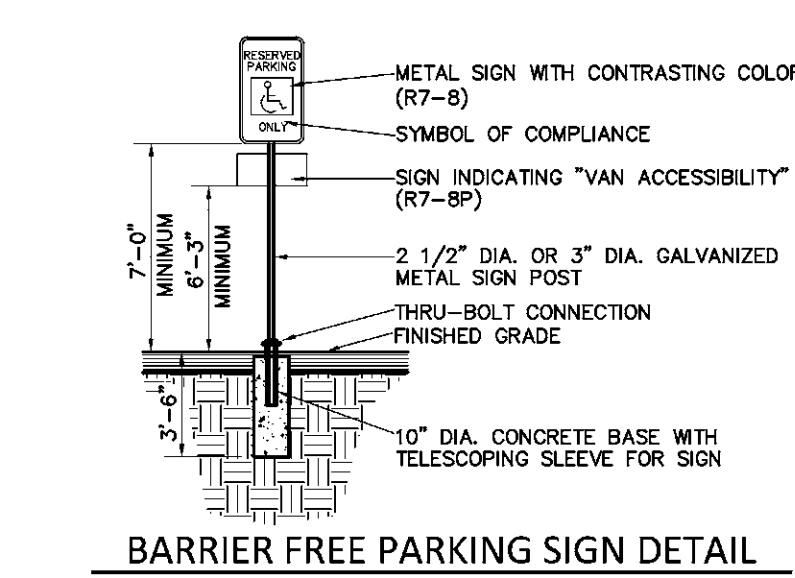
SCALE 1"=5'



Location Map
N.T.S.

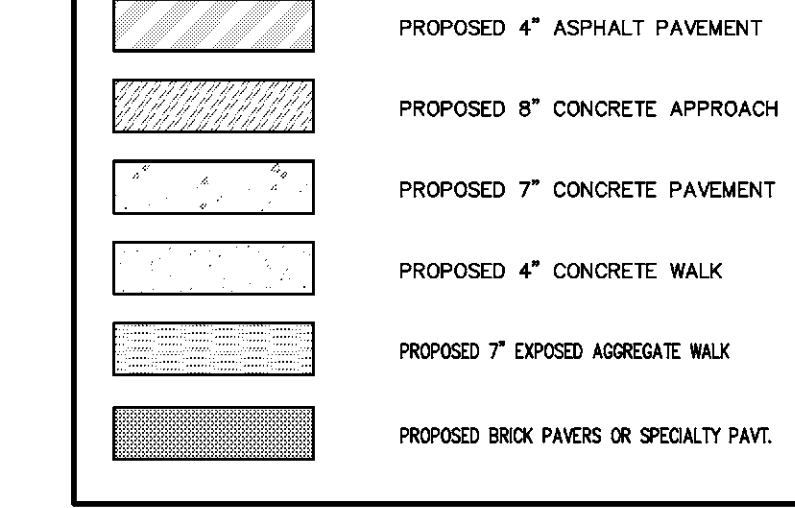


BARRIER FREE RAMP DETAIL
N.T.S.

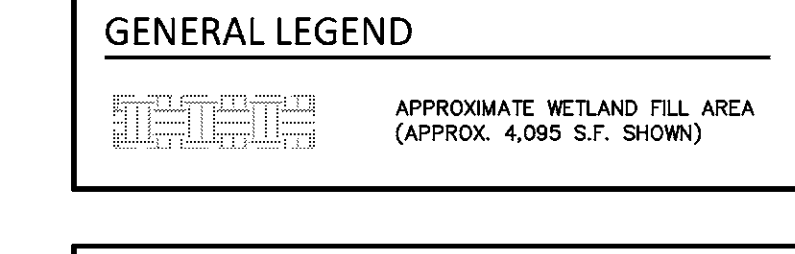


BARRIER FREE PARKING SIGN DETAIL
N.T.S.
Provide (1) for each accessible parking space

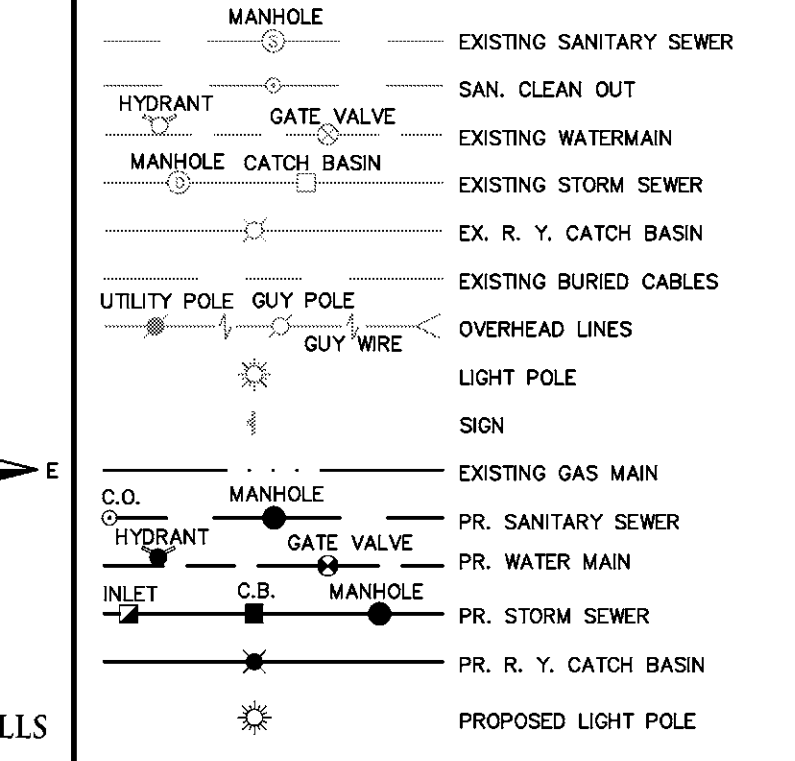
GENERAL PAVING LEGEND



GENERAL LEGEND



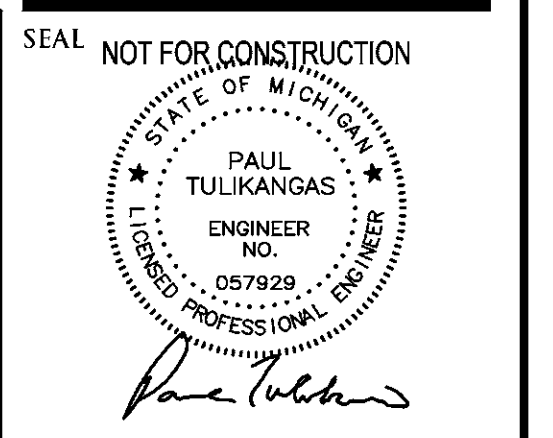
LEGEND



NOWAK & FRAUS ENGINEERS

CIVIL ENGINEERS
 LAND SURVEYORS
 LAND PLANNERS

NOWAK & FRAUS ENGINEERS
 46777 WOODWARD AVE.
 PONTIAC, MI 48342-5032
 TEL. (248) 332-7931
 FAX. (248) 332-8257



PROJECT
 North Row Development
 Rochester Hills

CLIENT
 North Row LLC
 720 Kimberly Drive
 Troy, MI 48098
 Contact: Kevin Baird
 Ph-248-709-2792

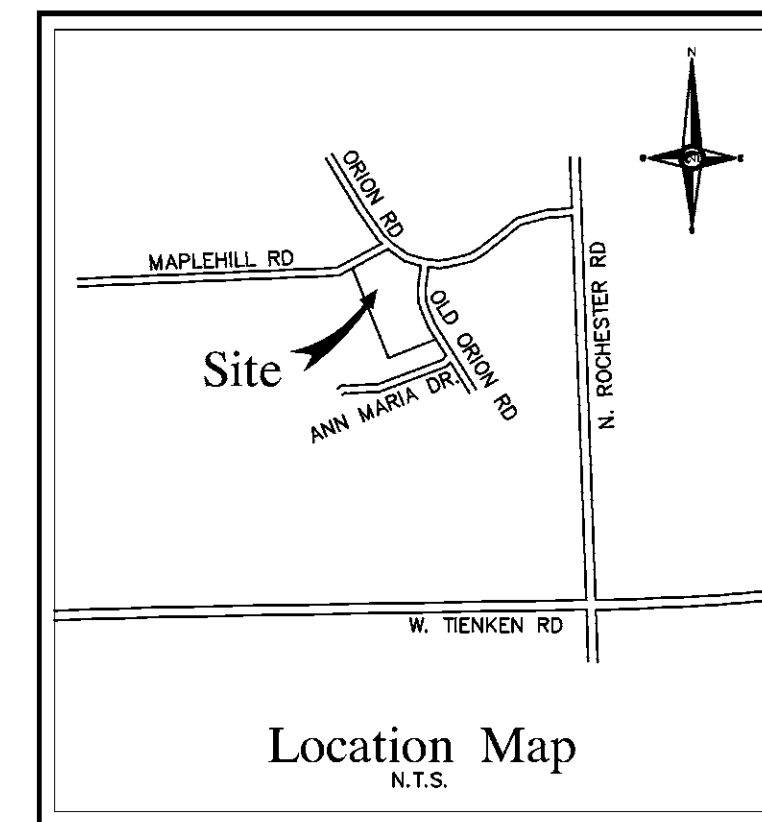
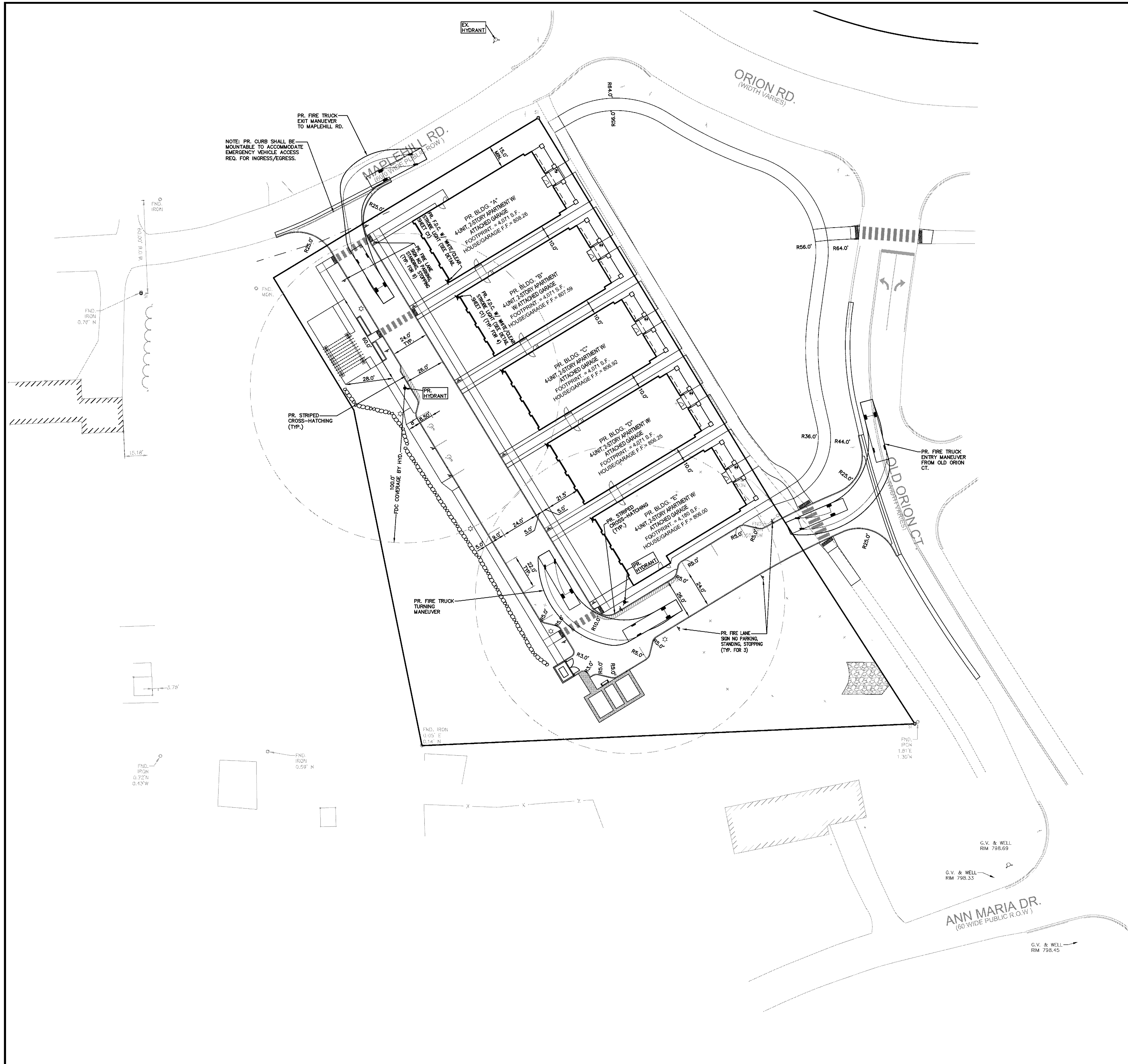
PROJECT LOCATION
 Part of the SE 1/4
 of Section 3
 T. 3N., R. 11E.
 City of Rochester Hills,
 Oakland County, Michigan

SHEET
 Overall Site Plan



DATE ISSUED/REVISED
 06-20-19 CIVIL S.P.A. - OWNER/ARCH. REVIEW
 10-31-19 REVISED PER CITY & ARCH. COMMENTS
 01-14-20 SITE PLAN APPROVAL
 02-11-20 PC - SPA (REV. 1)
 04-01-20 PC - SPA (REV. 2)
 09-14-20 PC - REV AMENITY SPACE PER EGLE
 10-02-20 PC - SPA (REV. 3)

DRAWN BY:
 P. Tulikang
 DESIGNED BY:
 P. Tulikang
 APPROVED BY:
 B. Buchholz
 DATE:
 02-09-2018
 SCALE: 1" = 30'
 30 15 0 15 30 45
 NFE JOB NO. SHEET NO.
 K176 C1



FIRE DEPARTMENT NOTES

FIRE LANES SHALL BE DESIGNATED BY THE FIRE CODE OFFICIAL, AND SHALL BE CONSPICUOUSLY POSTED ON BOTH SIDES OF THE FIRE LANE, WITH FIRE LANE SIGNS SPACED NOT MORE THAN 100 FEET APART. FIRE LANE SIGNS SHALL READ "NO STOPPING, STANDING, PARKING, FIRE LANE", AND SHALL CONFORM TO THE MICHIGAN MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.

PROVIDE A WHITE/CLEAR STROBE LIGHT OVER EACH FIRE DEPARTMENT CONNECTION.

PROPOSED BUILDING CONSTRUCTION TYPE: 5B (FOR ALL BUILDINGS)
TOTAL APPROX. BUILDING SQ. FOOTAGE: 20,464 S.F. (BUILDINGS A,B,C,D,E)

THE CONSTRUCTION TYPE AND SQUARE FOOTAGE OF BUILDING REQUIRE A FIRE FLOW OF 2000 GPM AND A MINIMUM OF 2 FIRE HYDRANTS, WITH AN AVERAGE SPACING OF 450 FEET.

A KNOX KEY SYSTEM SHALL BE INSTALLED, IN A LOCATION APPROVED BY THE FIRE CODE OFFICIAL. ORDERING INFORMATION IS AVAILABLE FROM THE KNOX COMPANY AT KNOXBOX.COM

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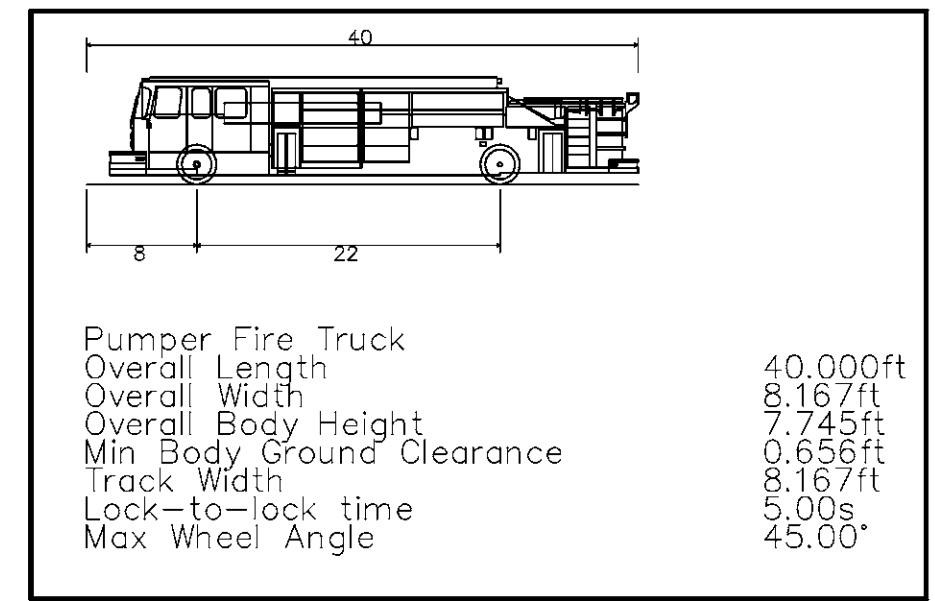
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FIRE LANE SIGN DETAIL
N.T.S.
Provide at spaces per fire department requirements

EMERGENCY VEHICLE LEGEND

	PLAN VIEW PUMPER FIRE TRUCK TURN REVIEW
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SUPPLEMENTAL FIRE DEPARTMENT NOTES

2,000 GPM HAS BEEN APPROVED BY BILL COOKE, ASSISTANT CHIEF/FIRE MARSHAL OF ROCHESTER HILLS, PER A CONVERSATION 10/21/18. USING TABLE C105.1 ONLY 2 HYDRANTS ARE REQUIRED TO MEET CITY SPECS.

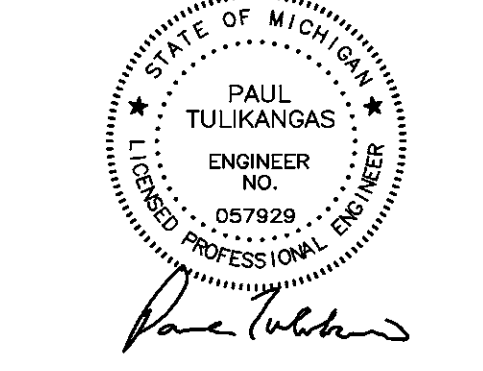


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LAND PLANNERS

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NOT FOR CONSTRUCTION



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Rochester Hills

CLIENT
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720 Kimberly Drive
Troy, MI 48098
Contact: Kevin Baird
Ph-248-709-2792

PROJECT LOCATION
Part of the SE 1/4 of Section 3
T. 3N., R. 11E.
City of Rochester Hills,
Oakland County, Michigan

SHEET
Emergency Vehicle Access
Plan



Know whats below
Call before you dig.

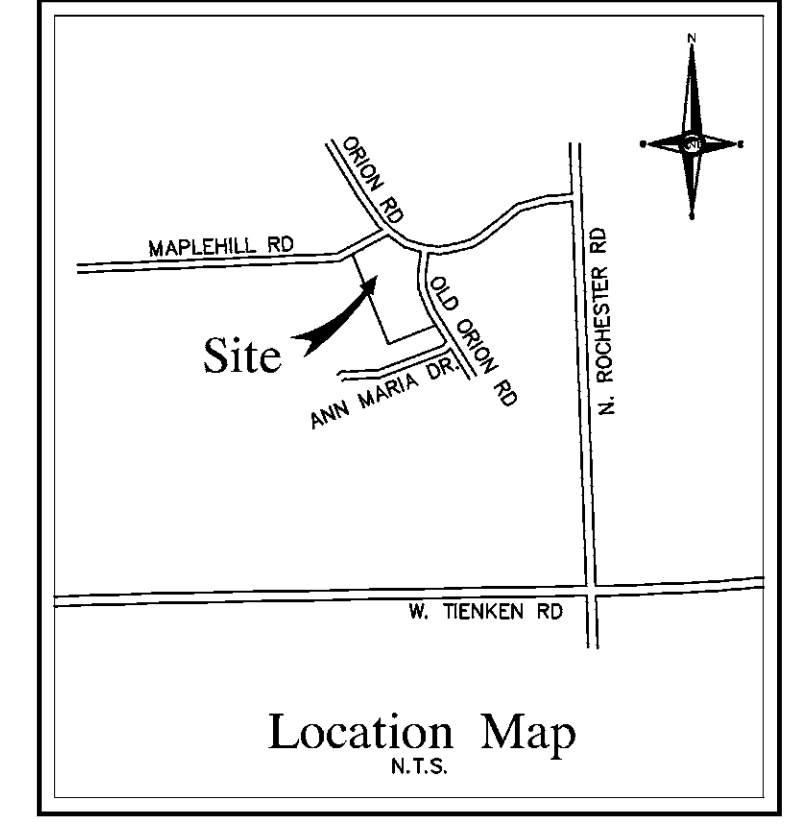
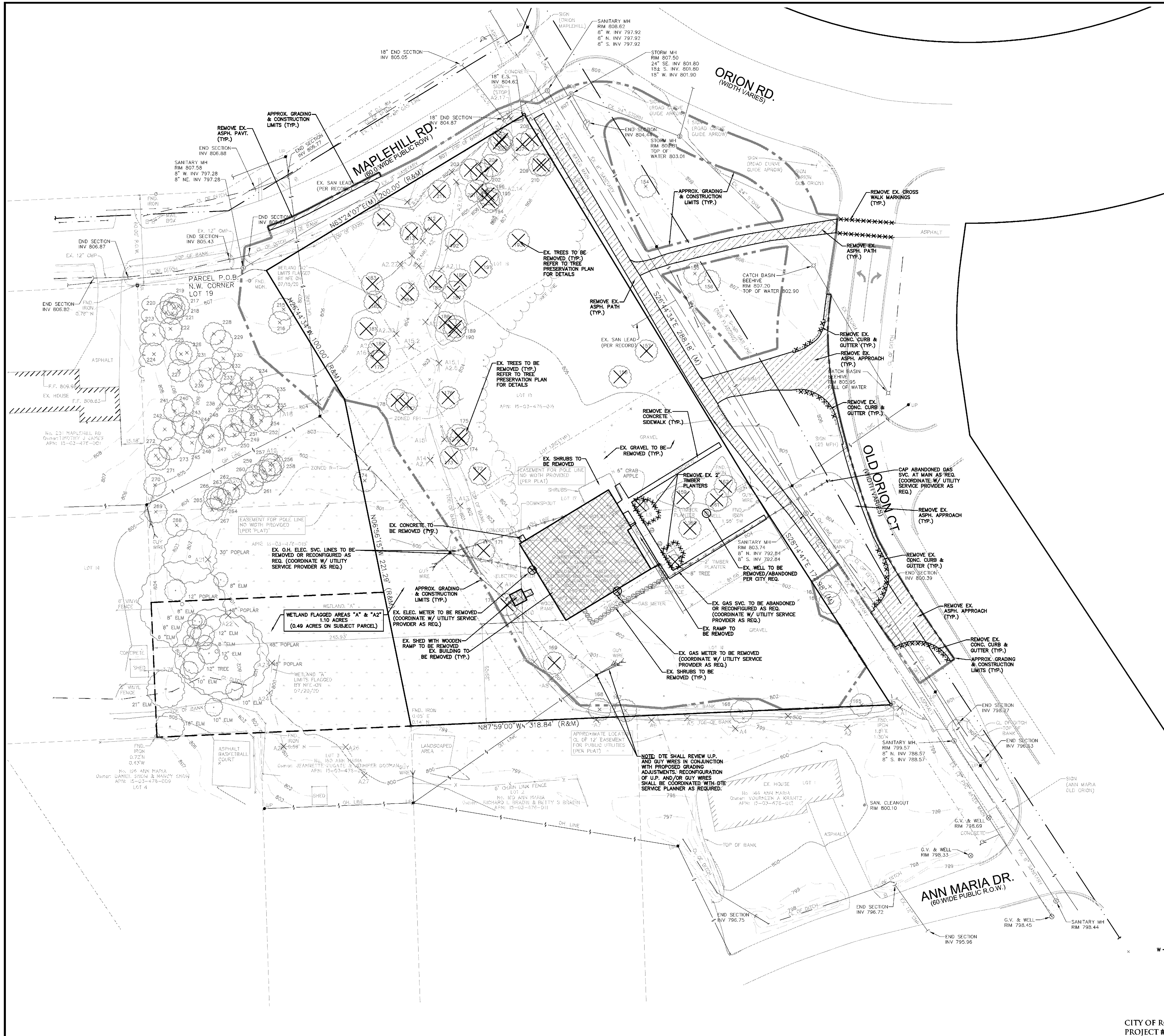
DATE	ISSUED/REVISED
06-20-19	CIVIL S.P.A. - OWNER/ARCH. REVIEW
10-31-19	REVISED PER CITY & ARCH. COMMENTS
01-14-20	SITE PLAN APPROVAL
02-11-20	PC - SPA (REV. 1)
04-01-20	PC - SPA (REV. 2)
09-14-20	PC - REV AMENITY SPACE PER EGLE
10-02-20	PC - SPA (REV. 3)

DRAWN BY:
P. Tulikangas
DESIGNED BY:
P. Tulikangas
APPROVED BY:
B. Buchholz
DATE:
02-09-2018

SCALE: 1" = 30'
30 15 0 15 30 45

NFE JOB NO. **SHEET NO.**
K176 **C1A**

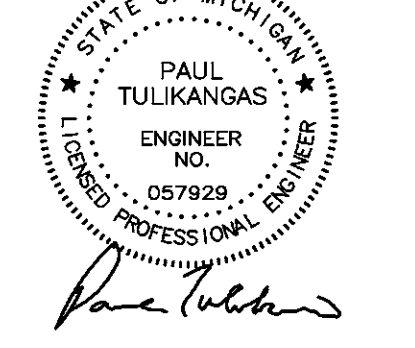
CITY OF ROCHESTER HILLS
PROJECT #19-042, SEC. 3



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 LAND SURVEYORS
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SEAL NOT FOR CONSTRUCTION



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 North Row Development
 Rochester Hills

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 Contact: Kevin Baird
 Ph-248-709-2792

PROJECT LOCATION
 Part of the SE 1/4
 of Section 3
 T. 3N., R. 11E.
 City of Rochester Hills,
 Oakland County, Michigan

SHEET
 Demolition Plan



DATE	ISSUED/REVISED
06-20-19	CIVIL S.P.A. - OWNER/ARCH. REVIEW
10-31-19	REVISED PER CITY & ARCH. COMMENTS
01-14-20	SITE PLAN APPROVAL
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04-01-20	PC - SPA (REV. 2)
09-14-20	PC - REV AMENITY SPACE PER EGLE
10-02-20	PC - SPA (REV. 3)

DRAWN BY:
 P. Tulikang
 DESIGNED BY:
 P. Tulikang
 APPROVED BY:
 B. Buchholz

DATE:
 02-09-2018

SCALE: 1" = 30'

NFE JOB NO. SHEET NO.
K176 C2

DEMOLITION NOTES

DEMOLITION OF SITE IMPROVEMENTS SHALL BE ALLOWED ONLY AFTER AN APPROVED PERMIT HAS BEEN SECURED FROM THE PUBLIC AGENCY HAVING JURISDICTION OVER SAID DEMOLITION.

FOR ANY DEMOLITION WITHIN PUBLIC RIGHT-OF-WAY, THE CONTRACTOR SHALL PAY FOR, AND SECURE, ALL NECESSARY PERMITS AND LICENSES AND SHALL ARRANGE FOR ALL SITE INSPECTIONS.

SITE DEMOLITION INCLUDES THE COMPLETE REMOVAL OF SITE IMPROVEMENTS AND OFF-SITE DISPOSAL. DEBRIS SHALL BE TRANSPORTED TO AN APPROPRIATE DISPOSAL FACILITY THAT IS LICENSED FOR THAT TYPE OF DEBRIS.

THE CONTRACTOR SHALL COORDINATE TRUCK ROUTES WITH THE MUNICIPALITY PRIOR TO COMMENCEMENT OF SITE DEMOLITION. ALL TRUCKS SHALL BE TARPED OR PROPERLY SECURED TO CONTAIN DEMOLITION DEBRIS PRIOR TO LEAVING SITE.

EXISTING ON-SITE UNDERGROUND UTILITIES AND BUILDING SERVICES HAVE BEEN INDICATED BASED UPON THE BEST AVAILABLE UTILITY RECORDS AND/OR ON-SITE INSPECTION. NO GUARANTEE IS MADE BY THE DESIGN ENGINEER AS TO THE COMPLETENESS OR ACCURACY OF UTILITY DATA. THE CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD VERIFICATION OF UTILITY INFORMATION (THE DESIGN ENGINEER MAKES NO GUARANTEE NOR ASSUMES ANY LIABILITY AS TO THE COMPLETENESS AND/OR ACCURACY OF UTILITY DATA).

PRIOR TO THE REMOVAL OR ABANDONMENT OF ANY EXISTING UNDERGROUND UTILITY OR BUILDING SERVICE LINES CALLED FOR IN THE PLANS OR DISCOVERED DURING EXCAVATION, THE CONTRACTOR MUST DETERMINE IF THE UTILITY LINE OR BUILDING SERVICE IS STILL IN USE. IF THE UTILITY LINE OR BUILDING SERVICE IS STILL IN USE/ACTIVE, THE CONTRACTOR MUST TAKE ALL THE NECESSARY STEPS TO GUARANTEE THAT THE UTILITY LINE OR BUILDING SERVICE IS RECONNECTED WITHOUT AN INTERRUPTION IN SERVICE. THE RECONNECTION OF THE UTILITY LINE OR BUILDING SERVICE MUST BE IN ACCORDANCE WITH THE STANDARDS AND REQUIREMENTS OF THE APPROPRIATE GOVERNMENTAL AGENCY OR PRIVATE UTILITY COMPANY.

SOIL EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE INSTALLED BY THE CONTRACTOR PRIOR TO SITE DEMOLITION.

* THE CONTRACTOR SHALL NOTIFY MISS DIG (1-800-482-7171) A MINIMUM OF THREE (3) WORKING DAYS PRIOR TO THE START OF THE SITE DEMOLITION.

THE CONTRACTOR SHALL COORDINATE THE REMOVAL AND/OR RELOCATION OF EXISTING UTILITY POLES AND BUILDING SERVICES WITH THE DETROIT EDISON COMPANY. REMOVAL OF DETROIT EDISON ELECTRICAL SERVICES SHALL BE IN ACCORDANCE WITH THE CURRENT STANDARDS AND REQUIREMENTS OF DETROIT EDISON.

THE CONTRACTOR SHALL COORDINATE THE REMOVAL AND/OR RELOCATION OF EXISTING UTILITY POLES AND BUILDING SERVICES WITH CONSUMERS ENERGY/MICHIGAN. REMOVAL OF CONSUMERS ENERGY/ MICHIGAN GAS SERVICES SHALL BE IN ACCORDANCE WITH THE STANDARDS AND REQUIREMENTS OF CONSUMERS ENERGY/MICHIGAN.

THE CONTRACTOR SHALL COORDINATE THE REMOVAL AND/OR RELOCATION OF EXISTING UTILITY POLES AND BUILDING SERVICES WITH AMERITECH. REMOVAL OF AMERITECH COMMUNICATION SERVICES SHALL BE IN ACCORDANCE WITH THE CURRENT STANDARDS AND REQUIREMENTS OF AMERITECH.

THE CONTRACTOR SHALL COORDINATE THE REMOVAL AND/OR RELOCATION OF EXISTING UTILITY POLES AND BUILDING SERVICES WITH THE APPROPRIATE CABLE MEDIA COMPANY. REMOVAL OF CABLE SERVICES SHALL BE IN ACCORDANCE WITH THE CURRENT STANDARDS AND REQUIREMENTS OF THE CABLE COMPANY.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFICATION OF PRIVATE UTILITY COMPANIES AND COORDINATE UTILITY SERVICE SHUT OFF/DISCONNECT, PRIOR TO DEMOLITION OF EXISTING STRUCTURES OR PROPERTIES.

ALL UTILITY METERS SHALL BE REMOVED BY THE APPROPRIATE UTILITY COMPANY.

ANY ON-SITE STORM SEWER FACILITIES LOCATED DURING DEMOLITION SHALL BE REMOVED AND BULK HEADED AT THE PROPERTY LINE IF INDICATED FOR REMOVAL ON THE PLANS.

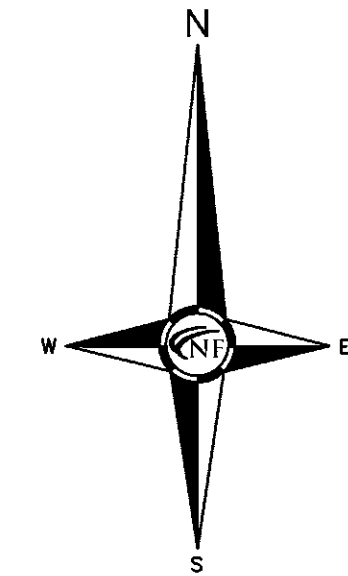
PRIOR TO BUILDING DEMOLITION, ALL HAZARDOUS MATERIAL SHALL BE REMOVED BY OTHERS. THE DEMOLITION CONTRACTOR SHALL IMMEDIATELY NOTIFY THE OWNER SHOULD ANY SUSPICIOUS MATERIAL BE FOUND.

WATER SERVICES AND/OR STOP-BOX SHALL BE PRESERVED AND BULK HEADED AT THE PROPERTY LINE OR AS DIRECTED BY THE OWNER'S REPRESENTATION.

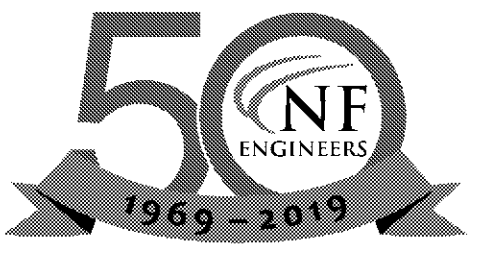
WHERE EXISTING BUILDINGS PLANNED FOR DEMOLITION FALL WITHIN PROPOSED BUILDING FOOTPRINTS, BASEMENT FLOOR SLABS, FOUNDATION WALLS AND FOOTINGS SHALL BE COMPLETELY REMOVED AND BACK FILLED WITH MOST CLASS II GRANULAR MATERIAL AND BE MACHINE COMPACTED TO A MINIMUM OF 98% OF MATERIALS MAXIMUM DENSITY.

LEGEND

MANHOLE	EXISTING SANITARY SEWER
HYDRANT	EXISTING SAN. CLEAN OUT
GATE VALVE	EXISTING WATER MAIN
MANHOLE	EXISTING STORM SEWER
CATCH BASIN	EXISTING R. Y. CATCH BASIN
UTILITY POLE	EXISTING BURIED CABLES
GUY POLE	OVERHEAD LINES
GUY WIRE	LIGHT POLE
SIGN	SIGN
EXISTING GAS MAIN	EXISTING UTILITY TO BE ABANDONED
EXISTING UTILITY TO BE REMOVED	EXISTING UTILITY TO BE REMOVED
EXISTING CURB / FENCE TO BE REMOVED	INDICATES EXISTING TREE TO BE REMOVED
INDICATES EXISTING TREE TO BE REMOVED	INDICATES UTILITY STRUCTURE OR L.P. TO BE REMOVED
INDICATES UTILITY STRUCTURE OR L.P. TO BE REMOVED	INDICATES MISCELLANEOUS REMOVAL
INDICATES MISCELLANEOUS REMOVAL	INDICATES AREAS OF ASPH. PAVT. TO BE REMOVED
INDICATES AREAS OF ASPH. PAVT. TO BE REMOVED	INDICATES AREAS OF CONC. PAVT. TO BE REMOVED
INDICATES AREAS OF CONC. PAVT. TO BE REMOVED	INDICATES BUILDING AREAS TO BE REMOVED
INDICATES BUILDING AREAS TO BE REMOVED	



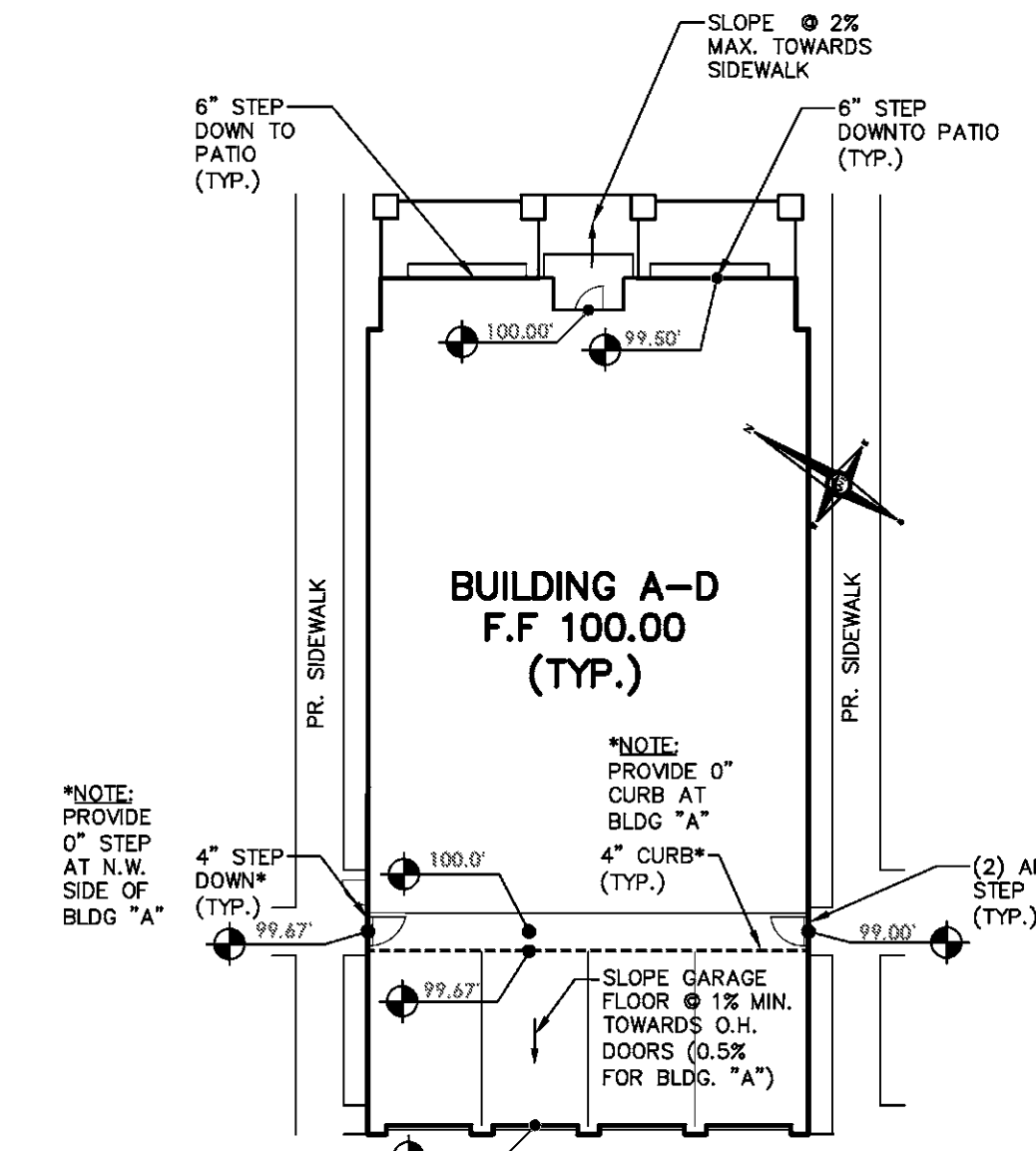
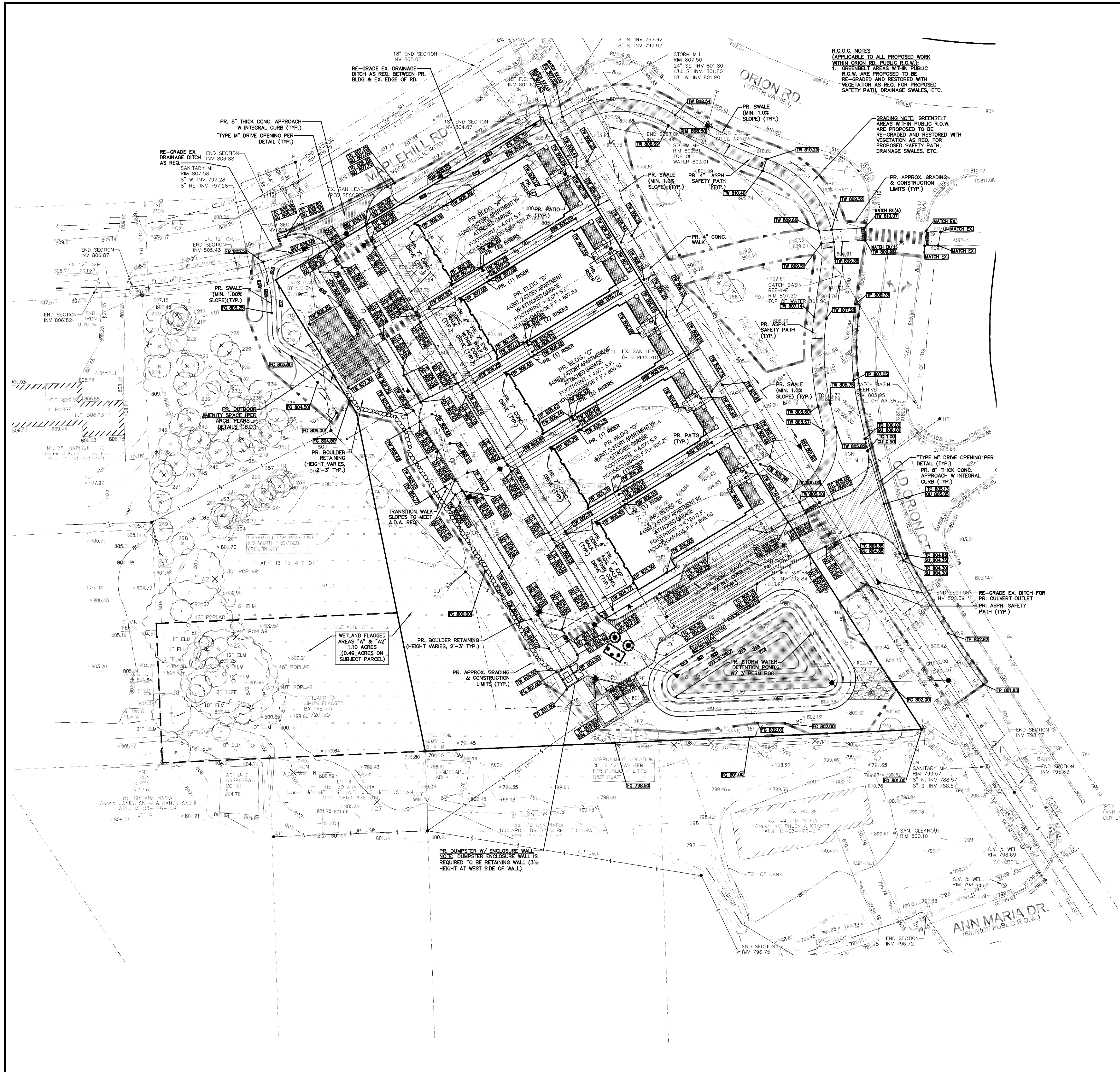
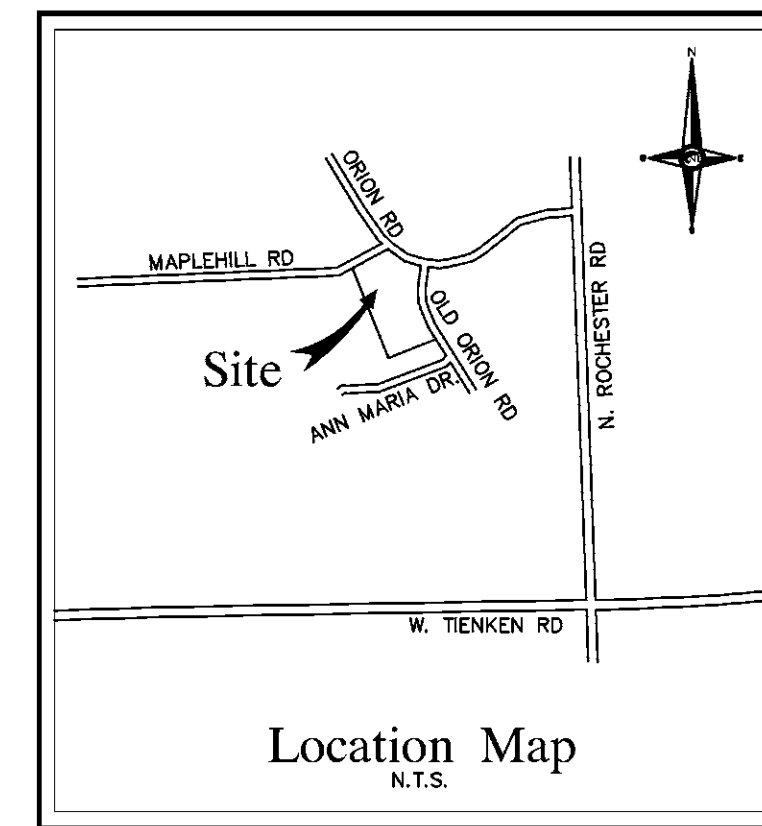
CITY OF ROCHESTER HILLS
 PROJECT #19-042, SEC. 3



NOWAK & FRAUS ENGINEERS

CIVIL ENGINEERS
LAND SURVEYORS
LAND PLANNERS

NOWAK & FRAUS ENGINEERS
46777 WOODWARD AVE.
PONTIAC, MI 48342-5032
TEL. (248) 332-7931
FAX. (248) 332-8257



GARAGE FLOOR SAMPLE GRADING FOR BUILDING A-D

SCALE: 1"=20'
BUILDING ELEVATIONS
A 0' STEP DOWN SHALL BE PROVIDED ON THE S.E. SIDE OF BUILDING E.

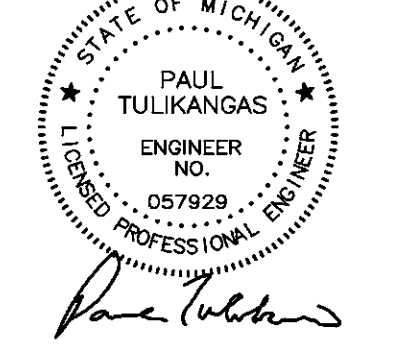
GENERAL PAVING LEGEND

	PROPOSED 4" ASPHALT PAVEMENT
	PROPOSED 8" CONCRETE APPROACH
	PROPOSED 4" CONCRETE PAVEMENT
	PROPOSED 4" CONCRETE WALK
	PROPOSED 7" EXPOSED AGGREGATE WALK
	PROPOSED BRICK PAVEMENT OR SPECIALTY PAVT.

LEGEND

	MANHOLE	EXISTING SANITARY SEWER
	HYDRANT	SAN. CLEAN OUT
	MANHOLE	EXISTING WATERMAIN
	UTILITY POLE	EXISTING STORM SEWER
	GUY POLE	EX. R. Y. CATCH BASIN
	GUY WIRE	EXISTING BURIED CABLES
	OVERHEAD LINES	LIGHT POLE
	SIGN	EXISTING GAS MAIN
	MANHOLE	PR. SANITARY SEWER
	GATE VALVE	PR. WATER MAIN
	C.B. MANHOLE	PR. STORM SEWER
	PR. R. Y. CATCH BASIN	PROPOSED LIGHT POLE
	PR. TOP OF CURB ELEVATION	
	PR. GUTTER ELEVATION	
	PR. TOP OF WALK ELEVATION	
	PR. TOP OF P.V.M.T. ELEVATION	
	FINISH GRADE ELEVATION	

NOT FOR CONSTRUCTION



PROJECT
North Row Development
Rochester Hills

CLIENT
North Row LLC
720 Kimberly Drive
Troy, MI 48098
Contact: Kevin Baird
Ph-248-709-2792

PROJECT LOCATION
Part of the SE 1/4 of Section 3
T. 3N., R. 11E.
City of Rochester Hills,
Oakland County, Michigan

SHEET
Paving & Grading Plan



Know what's below
Call before you dig.

DATE	ISSUED/REVISED
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01-14-20	SITE PLAN APPROVAL
02-11-20	PC - SPA (REV. 1)
04-01-20	PC - SPA (REV. 2)
09-14-20	PC - REV AMENITY SPACE PER EGLE
10-02-20	PC - SPA (REV. 3)

DRAWN BY:
P. Tulikangas
DESIGNED BY:
P. Tulikangas
APPROVED BY:
B. Buchholz
DATE:
02-09-2018

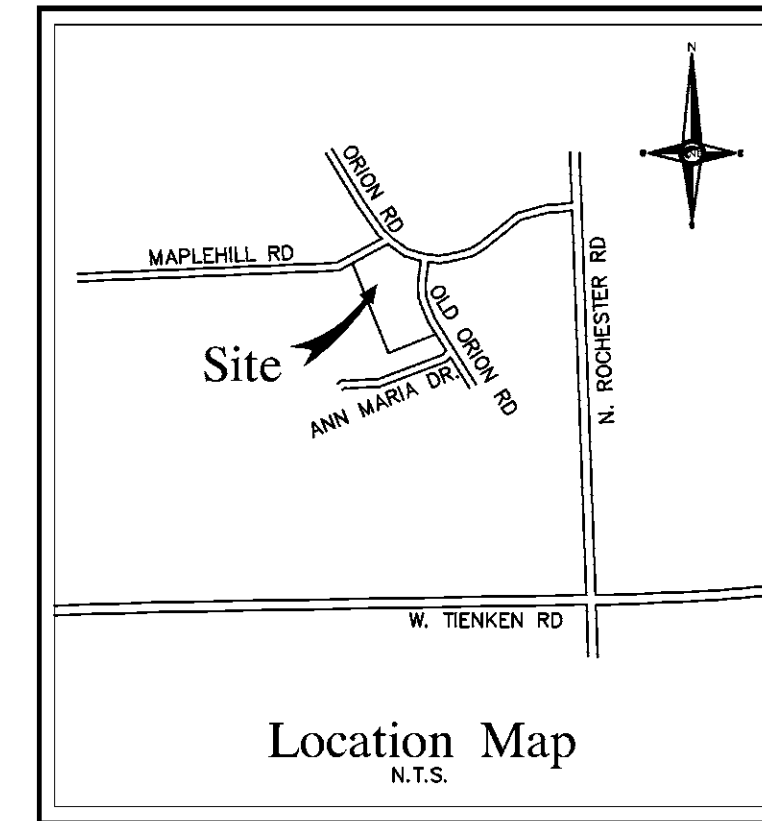
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NFE JOB NO. SHEET NO.
K176 C3



NOWAK & FRAUS ENGINEERS

CIVIL ENGINEERS
LAND SURVEYORS
LAND PLANNERS

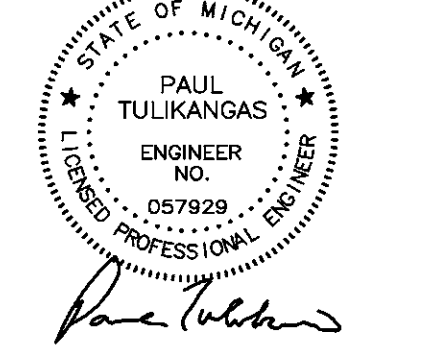
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TEL. (248) 332-7931
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Location Map
N.T.S.

Structure Name	Structure Details
#CB1	PR. 4 DIA SHALLOW CATCH BASIN PR. RIM 804.45 PR. 8" NE. INV. 801.20
#CB2	PR. 4 DIA SHALLOW CATCH BASIN PR. RIM 803.50 PR. 8" E. INV. 800.80
#CB3	PR. 4 DIA SHALLOW CATCH BASIN PR. RIM 803.50 PR. 8" N. INV. 800.80
#ES1	PR. 18" END SECTION PR. 18" NW. INV. 800.00
#ES2	PR. 12" END SECTION PR. 12" SE. INV. 801.50
#ES3	PR. 12" END SECTION PR. 12" NW. INV. 800.75
#ES4	PR. 18" END SECTION PR. 18" E. INV. 805.50
#ES5	PR. 18" END SECTION PR. 18" SW. INV. 805.00
#FD1	PR. RIM 804.48 PR. 18" NW. INV. 800.25 PR. 18" SE. INV. 800.25 PR. 18" SW. INV. 800.25
#MH1	PR. RIM 807.90 PR. 12" SE. INV. 802.68 PR. 8" NE. INV. 803.00
#MH2	PR. RIM 805.35 PR. 12" NW. INV. 801.00 PR. 8" SW. INV. 801.00 PR. 18" SE. INV. 800.60 PR. 8" NE. INV. 801.00
#MH3	PR. RIM 804.80 PR. 18" NW. INV. 800.30 PR. 8" W. INV. 800.50 PR. 8" S. INV. 800.50 PR. 18" SE. INV. 800.30 PR. 8" NE. INV. 800.50
#MH4	PR. RIM 808.12 PR. 18" W. INV. 805.38 PR. 18" NE. INV. 805.28
#MH5	PR. RIM 804.40 PR. 18" NW. INV. 800.22 PR. 12" NE. INV. 800.20 PR. 18" SE. INV. 800.10 PR. 18" SW. INV. 800.22
#MH6	PR. RIM 801.85 PR. 12" W. INV. 799.50
#OC1	PR. RIM 804.00 PR. 12" E. INV. 800.00
#CB5	PR. 8" N. FIELD VERIFY & RECONNECT PR. 8" S. FIELD VERIFY & RECONNECT
#PT1	PR. 18" Inlet 800.23 PR. 18" Outlet 800.23

NOT FOR CONSTRUCTION



PROJECT
North Row Development
Rochester Hills

CLIENT
North Row LLC
720 Kimberly Drive
Troy, MI 48098
Contact: Kevin Baird
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Part of the SE 1/4
of Section 3
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City of Rochester Hills,
Oakland County, Michigan

SHEET
Utility Plan



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DRAWN BY:
P. Tulikang

DESIGNED BY:
P. Tulikang

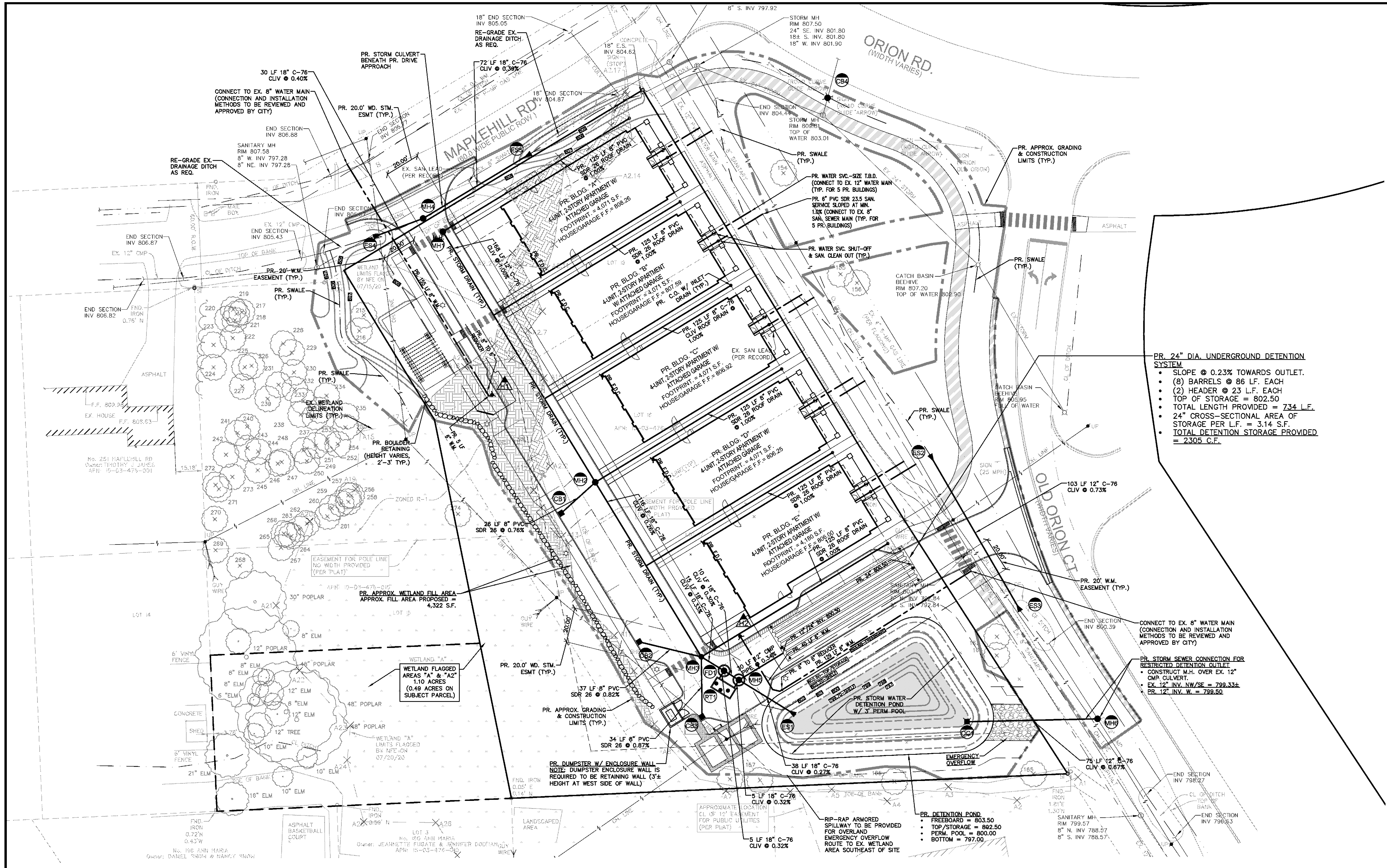
APPROVED BY:
B. Buchholz

DATE:
02-09-2018

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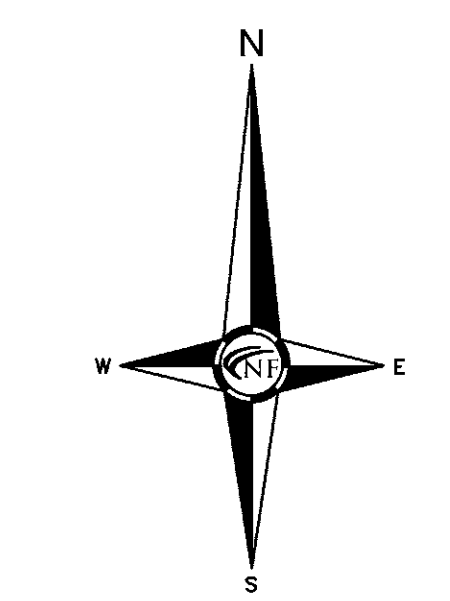
NFE JOB NO. SHEET NO.
K176 C4



SANITARY FLOWS:
Using Ten States Standards Equation for Peak Flow:

Note: Each Building will contain 4 multi-family units, and utilize a single 6" diameter sanitary service connection to the existing 8" diameter public sanitary sewer main.

OCWRC Unit Factor: Multiple Family Residences:	0.6 REUs per Unit
Number of Residential Units Per Building	4 REUs
Total REUs per Building	2.4 REUs
Number of Buildings	5 Buildings
Total REUs	12 REU
Density per Unit:	3 people/unit
Design/Ultimate Population to be Served:	36 people
Design Flowrate (per capita) is:	100 gpd
Design Contribution (per REU) is:	300 gpd
Peak Flow is:	434 gpd
Design Flow converted to gpm:	2.50 gpm
Peak Flow converted to gpm:	10.85 gpm
Peak Flow converted to cfs:	0.024 cfs
Design Flow converted to cfs:	0.006 cfs
Capacity of Pr. 6" PVC Service @ 1.0%	0.608 cfs



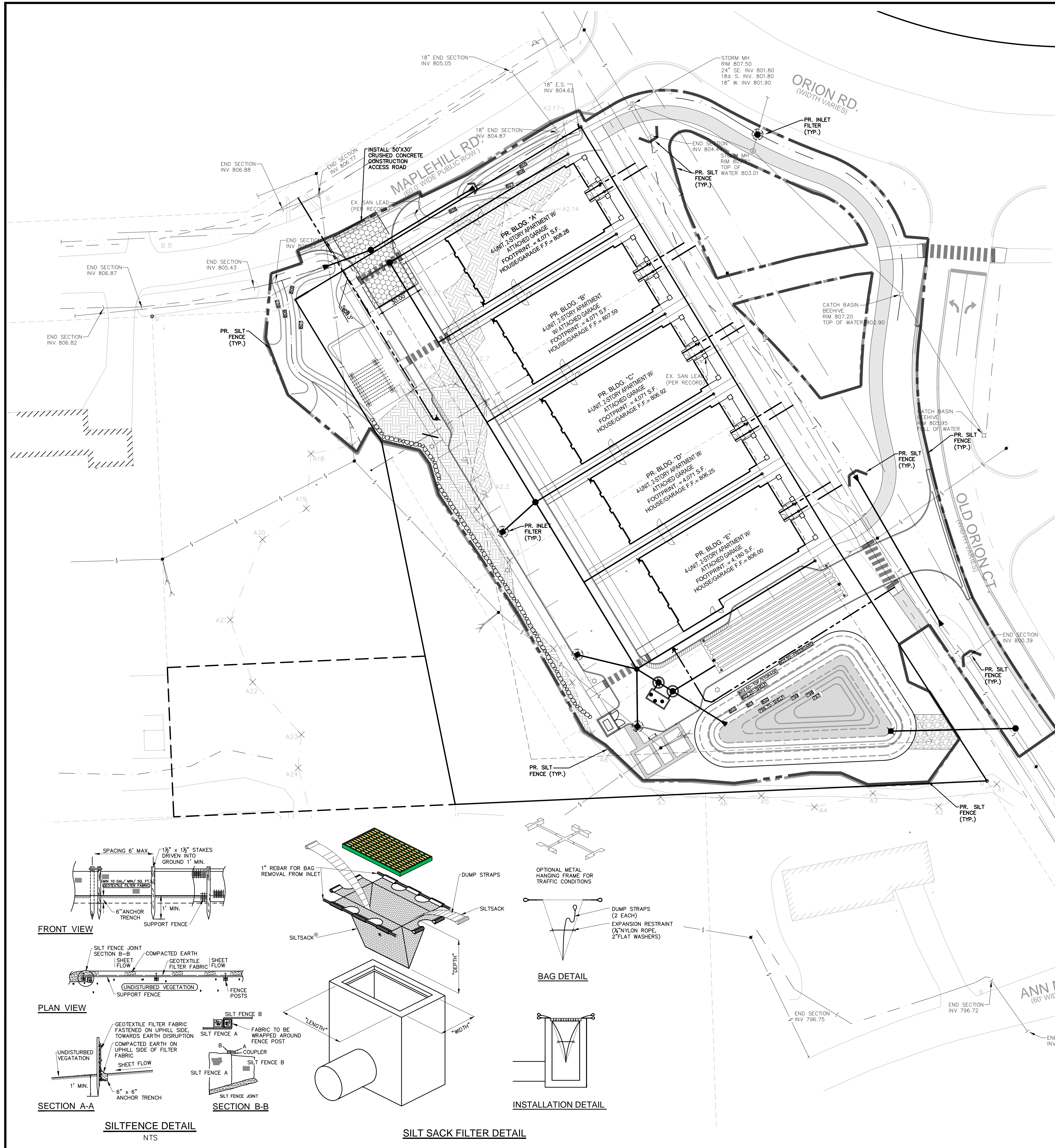
CITY OF ROCHESTER HILLS
PROJECT #19-042, SEC. 3

LEGEND

MANHOLE	EXISTING SANITARY SEWER
HYDRANT	SAN. CLEAN OUT
MANHOLE CATCH BASIN	EXISTING WATERMAIN
UTILITY POLE	EXISTING STORM SEWER
GUY WIRE	EX. R. Y. CATCH BASIN
GUY WIRE	EXISTING BURIED CABLES
GUY WIRE	EXISTING OVERHEAD LINES
SIGN	LIGHT POLE
C.O.	EXISTING GAS MAIN
MANHOLE	PR. SANITARY SEWER
HYDRANT	PR. WATER MAIN
INLET	PR. STORM SEWER
MANHOLE	PR. R. Y. CATCH BASIN
SIGN	PROPOSED LIGHT POLE

PROPOSED WATER MAIN SCHEDULE

PR. HYDRANT ASSEMBLY PR. F.G. 806.05 PR. 6" T/PIPE 800.55	PR. HYDRANT ASSEMBLY PR. F.G. 805.10 PR. 6" T/PIPE 799.50
---	---



SOIL EROSION CONTROL - SEQUENCE OF OPERATION (NEW CONSTRUCTION)

INSTALL CRUSHED CONCRETE ACCESS DRIVE AND TEMPORARY CULVERTS AT THE SITE ENTRANCE AS INDICATED ON THE PLANS.

INSTALL SILT FENCE OR SIMILAR APPROVED SILT BARRIER ALONG PROPERTY LINES AND AROUND SENSITIVE NATURAL FEATURES AS INDICATED ON THE PLANS.

EXCAVATE A SHALLOW SWALE/DITCH AROUND PERIMETER OF SITE. GRADE THE TEMPORARY SWALE TO AN EXISTING DRAINAGE FACILITY. PLACE OUTLET FILTER IN EXISTING UPSTREAM STORM SEWER FACILITIES.

IF INDICATED ON CONSTRUCTION PLANS, SEDIMENTATION BASINS, DETENTION POND, ETC., SHALL BE CONSTRUCTED PRIOR TO THE INSTALLATION OF ANY OTHER WORK.

STRIP EXISTING TOPSOIL, VEGETATION AND ORGANIC MATTER FROM BUILDING PAD AND PARKING AREAS. COMMENCE LAND BALANCE AND MASS GRADING OPERATIONS. MAINTAIN A MINIMUM BUFFER OF 15' OF EXISTING VEGETATION WHEREVER POSSIBLE AROUND SITE PERIMETER. STOCK PILES SHOULD BE LOCATED AWAY FROM EXISTING DRAINAGE FACILITIES.

EXCAVATE AND INSTALL UNDERGROUND UTILITIES. INSTALL PEASTONE INLET FILTERS AROUND ALL NEW STORM SEWER FACILITIES AS INDICATED ON THE PLANS. EXISTING AND PROPOSED STORM SEWER FACILITIES SHALL BE PROTECTED FROM EROSION AND SEDIMENT INFILTRATION AT ALL TIMES.

COMMENCE FINAL GRADING AND TRIMMING OPERATIONS. PREPARE SUBGRADE FOR INSTALLATION OF PROPOSED PAVEMENT.

SEED AND MULCH ALL DISTURBED SITE AREAS AND INSTALLED SITE LANDSCAPING.

REMOVE CONSTRUCTION DEBRIS AND JET VAC NEWLY INSTALLED STORM SEWER SYSTEM AS REQUIRED BY THE MUNICIPALITY.

REMOVE ALL REMAINING TEMPORARY SOIL EROSION AND SEDIMENTATION CONTROL MEASURES ONCE PERMANENT MEASURES ARE ESTABLISHED.

WHENEVER POSSIBLE, THE SITE SHALL BE GRADED TO WITHIN SIX INCHES (6") OF THE PROPOSED FINISH GRADE. PRIOR TO INSTALLATION OF UNDERGROUND FACILITIES.

STAGING OF PROPOSED WORK SHALL BE COMPLETED BY THE CONTRACTOR AS REQUIRED TO ENSURE PROGRESSIVE STABILIZATION OF DISTURBED AREAS.

SOIL EROSION CONTROL

CUTTING, FILLING AND GRADING SHALL BE MINIMIZED AND THE NATURAL TOPOGRAPHY OF THE SITE SHALL BE PRESERVED TO THE MAXIMUM POSSIBLE EXTENT, EXCEPT WHERE SPECIFIC FINDINGS DEMONSTRATE THAT MAJOR ALTERATIONS WILL STILL MEET THE PURPOSES AND REQUIREMENTS OF THIS ORDINANCE.

DEVELOPMENT SHALL BE STAGED TO KEEP THE EXPOSED AREAS OF SOIL AS SMALL AS PRACTICABLE.

SOIL EROSION CONTROL MEASURES SHALL BE INSTALLED BETWEEN THE DISTURBED AREA AND ANY WATERCOURSES, INCLUDING RIVERS, STREAMS, CREEKS, LAKES, PONDS AND OTHER WATERCOURSES; WETLANDS; OR ROADWAYS ON OR NEAR THE SITE.

SEDIMENT RESULTING FROM ACCELERATED SOIL EROSION SHALL BE REMOVED FROM RUNOFF WATER BEFORE THAT WATER LEAVES THE SITE.

TEMPORARY AND PERMANENT SOIL EROSION CONTROL MEASURES DESIGNED AND CONSTRUCTED FOR THE CONVEYANCE OF WATER AROUND, THROUGH, OR AWAY FROM THE SITE SHALL BE DESIGNED TO LIMIT THE WATER FLOW TO A NON-EROSIVE VELOCITY.

TEMPORARY SOIL EROSION CONTROL MEASURES SHALL BE REMOVED AFTER PERMANENT SOIL EROSION CONTROL MEASURES HAVE BEEN IMPLEMENTED. ALL SITES SHALL BE STABILIZED WITH PERMANENT SOIL EROSION CONTROL MEASURES.

IF LAKES, PONDS, CREEKS, STREAMS, OR WETLANDS ARE LOCATED ON OR NEAR THE SITE, EROSION CONTROL MEASURES WHICH DIVERT RUNOFF AND TRAP SEDIMENT MUST BE PROVIDED AT STRATEGIC LOCATIONS. STRAW BALE BERMS MAY BE USED AS TEMPORARY STORMWATER DIVERSION STRUCTURES, BUT WILL NOT BE CONSIDERED SUFFICIENT FOR TRAPPING SEDIMENT. THE USE OF SEDIMENT BASINS, FILTER FABRIC, VEGETATED BUFFER STRIPS, AND ROCK FILTERS IN LIEU OF STRAW BALE BERMS SHALL BE STRONGLY ENCOURAGED. OTHER MEASURES MAY BE REQUIRED IF REASONABLY DETERMINED TO BE NECESSARY TO PROTECT A WATERCOURSE OR WETLAND.

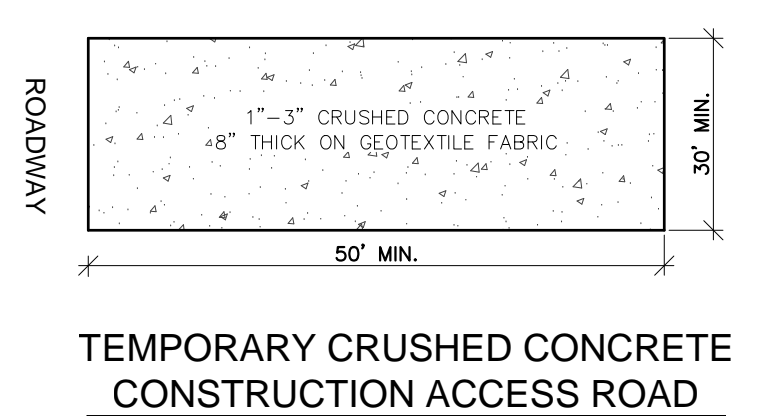
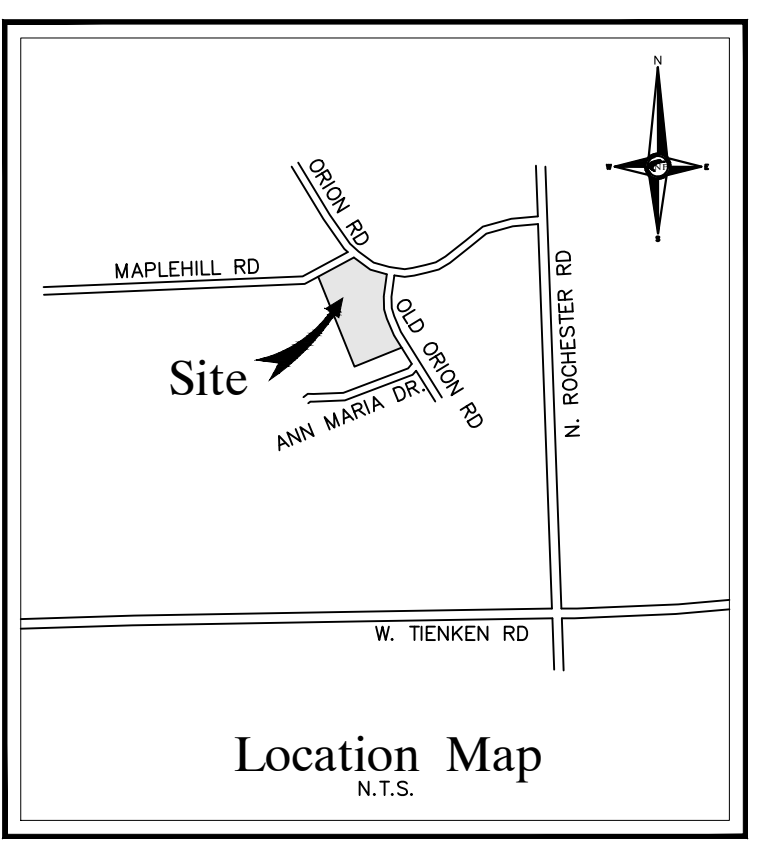
WHEN IT IS NOT POSSIBLE TO PERMANENTLY STABILIZE A DISTURBED AREA AFTER AN EARTH CHANGE HAS BEEN COMPLETED OR WHEN SIGNIFICANT EARTH CHANGE ACTIVITY CEASES, TEMPORARY SOIL EROSION CONTROL MEASURES SHALL BE INSTALLED.

PERMANENT EROSION CONTROL MEASURES FOR ALL SLOPES, CHANNELS, DITCHES, OR ANY DISTURBED LAND AREA SHALL BE COMPLETED WITHIN 15 (FIFTEEN) CALENDAR DAYS AFTER FINAL GRADING OR THE FINAL EARTH CHANGE HAS BEEN COMPLETED. ALL TEMPORARY SOIL EROSION CONTROL MEASURES SHALL BE MAINTAINED UNTIL PERMANENT SOIL EROSION CONTROL MEASURES ARE IMPLEMENTED.

VEGETATED BUFFER STRIPS SHALL BE CREATED OR RETAINED ALONG THE EDGES OF ALL LAKES, PONDS, CREEKS, STREAMS, OTHER WATERCOURSES, OR WETLANDS.

EROSION AND SEDIMENTATION CONTROL MEASURES SHALL RECEIVE REGULAR MAINTENANCE TO ASSURE PROPER FUNCTIONING.

ALL GRADING PLANS AND SPECIFICATIONS, INCLUDING EXTENSIONS OF PREVIOUSLY APPROVED PLANS, SHALL INCLUDE PROVISIONS FOR EROSION AND SEDIMENT CONTROL, IN ACCORDANCE WITH, BUT NOT LIMITED TO, THE STANDARDS CONTAINED IN THE "STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL", PUBLISHED BY THE OAKLAND SOIL CONSERVATION DISTRICT.



CONSTRUCTION SEQUENCE / TIMING SCHEDULE	
1. INSTALL PERIMETER FILTER FABRIC FENCING AND STONE FILTER WHERE REQUIRED.	APRIL 2021
2. MASS GRADE SITE.	APRIL 2021
3. COMMENCE UNDERGROUND UTILITY WORK.	MAY 2021
4. INSTALL INLET FILTERS ON PROPOSED DRAINAGE STRUCTURES.	MAY 2021
5. FILL IN SEDIMENTATION TRAPS AND PAVE SITE.	JUNE 2021
6. COMPLETE ALL BUILDINGS AND LANDSCAPE ACTIVITY.	OCTOBER 2021
7. JET VAC NEW STORM SEWER SYSTEM AS REQUIRED.	OCTOBER 2021
8. REMOVE ALL TEMPORARY SOIL EROSION MEASURES.	NOVEMBER 2021

NOTES

REFER TO THE WRC SOIL EROSION AND SEDIMENTATION CONTROL DETAIL SHEET FOR ALL ADDITIONAL NOTES & DETAILS (TYP)

A DISTANCE OF 2.59 MILES TO THE NEAREST BODY OF WATER (STONY CREEK LAKE).

THE TOTAL AREA OF EARTH DISRUPTION IS 2.85 ACRES.

THE SOIL EROSION CONTROLS WILL BE MAINTAINED WEEKLY AND AFTER EVERY STORM EVENT BY THE CONTRACTOR

A SOIL EROSION PERMIT IS REQUIRED FROM THE OAKLAND COUNTY.

SOIL DATA

THIS SITE CONSISTS OF 15B (SPINKS LOAMY SAND, 0 TO 6 PERCENT SLOPES) & 17A (WASEPI SANDY LOAM, 0 TO 3 PERCENT SLOPES)

BASED ON DATA PROVIDED BY THE UNITED STATES DEPARTMENT OF AGRICULTURE, NATURAL RESOURCES CONSERVATION SERVICE.

ON-SITE CONTACT

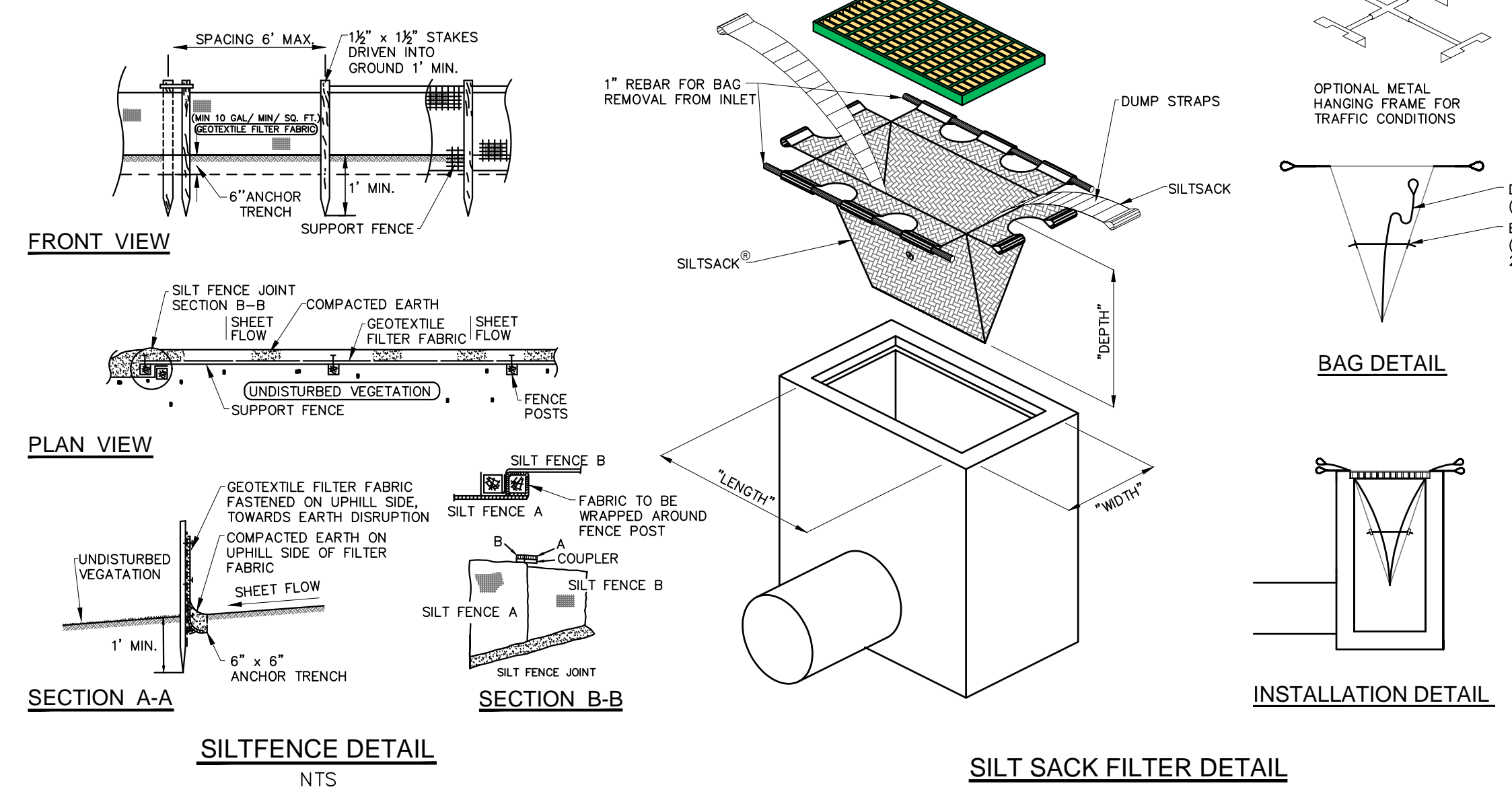
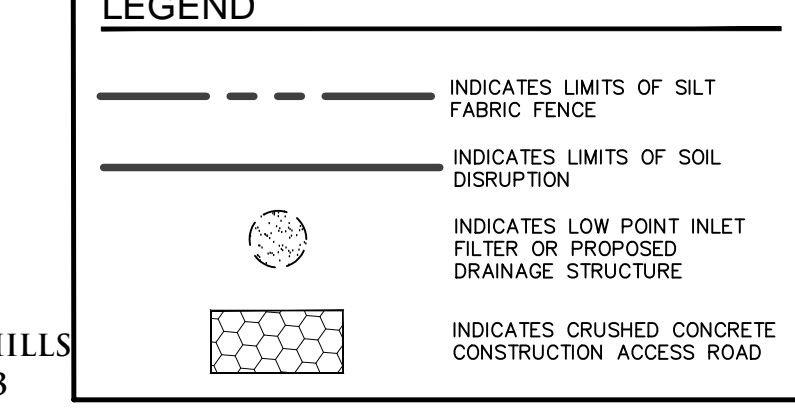
THE SITE CONTACT PERSON RESPONSIBLE FOR MAINTENANCE OF SOIL EROSION CONTROL MEASURES SHALL BE:

ESTIMATED QUANTITIES

NOTE: THE BELOW QUANTITIES ARE FOR REFERENCE PURPOSES ONLY. CONTRACTOR SHALL BE RESPONSIBLE TO PERFORM HIS OWN QUANTITY TAKEOFFS & ESTIMATE CALCULATIONS PRIOR TO BIDDING.

DESCRIPTION	QUANTITY	UNITS
SILT FABRIC FENCING	1621	L.F.
INLET FILTER	4	E.A.
SILT SACK OR EQUAL	4	E.A.
CONSTRUCTION ACCESS ROAD	166	S.Y.

LEGEND

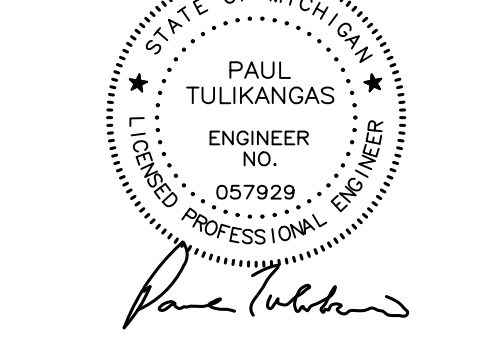


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SHEET
Soil Erosion and
Sedimentation Control
Plan



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DRAWN BY:
P. Tulikang
DESIGNED BY:
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APPROVED BY:
B. Buchholz
DATE:
02-09-2018
SCALE: 1" = 30'
NFE JOB NO. SHEET NO.
K176 C5

CITY OF ROCHESTER HILLS
PROJECT #19-042, SEC. 3

GENERAL NOTES:

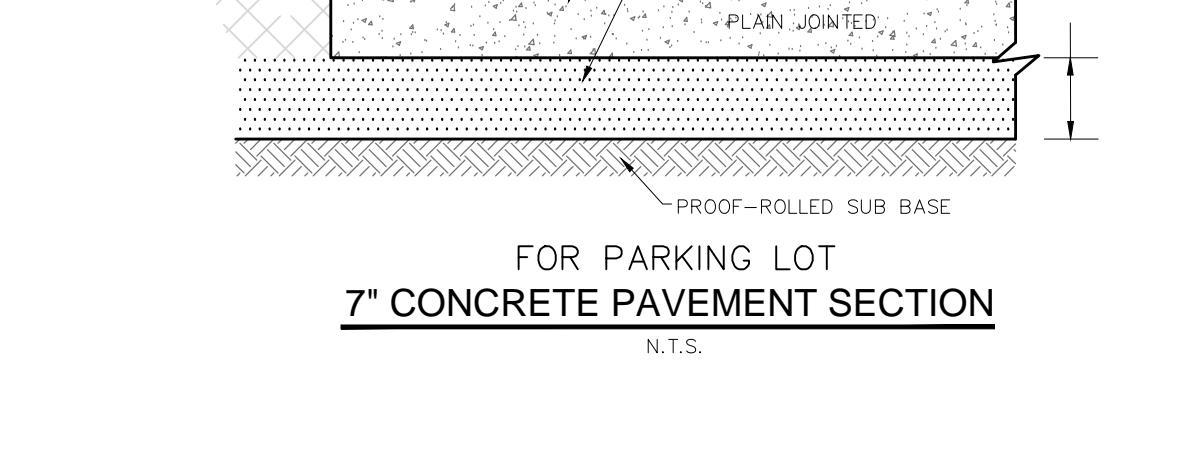
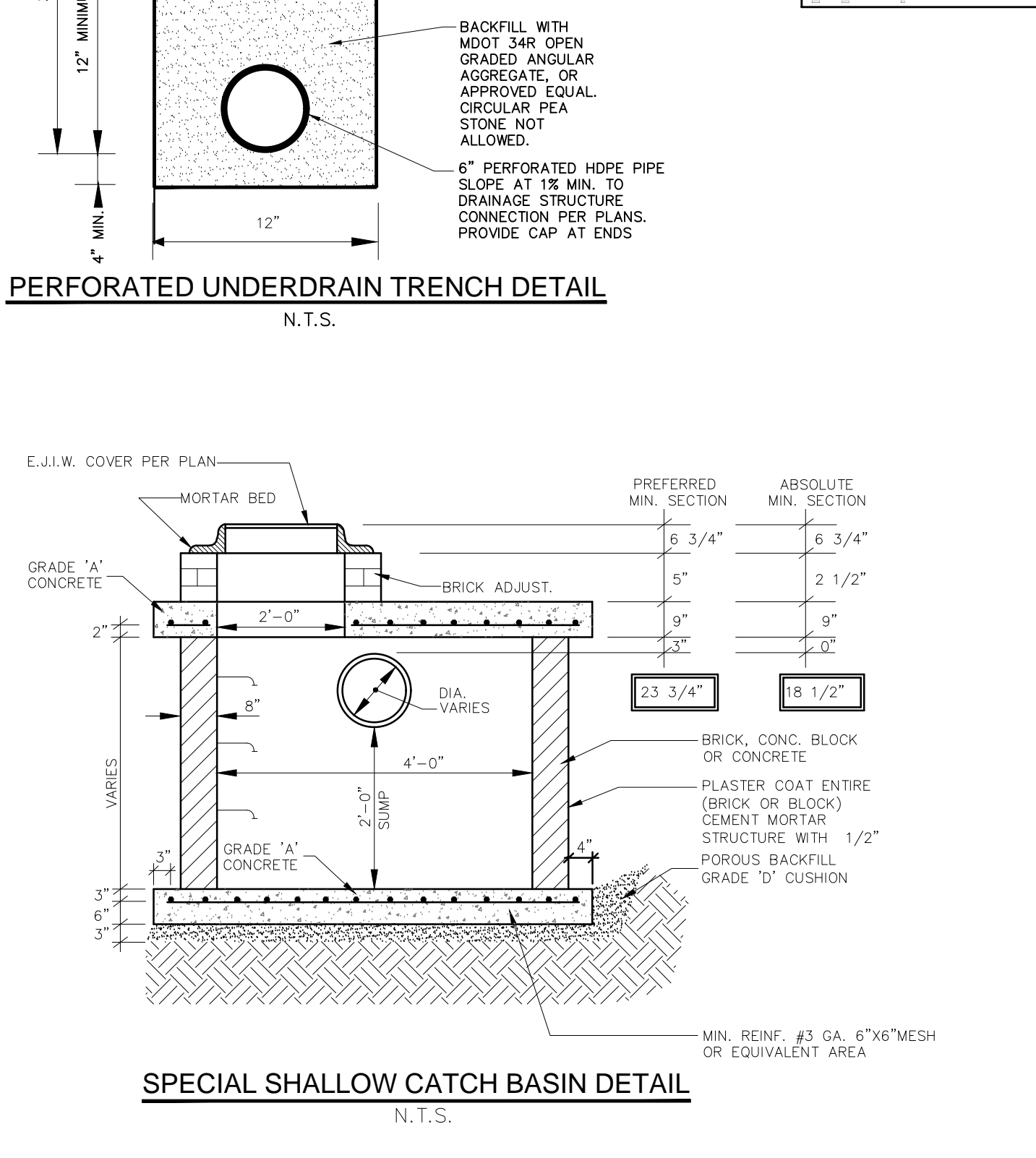
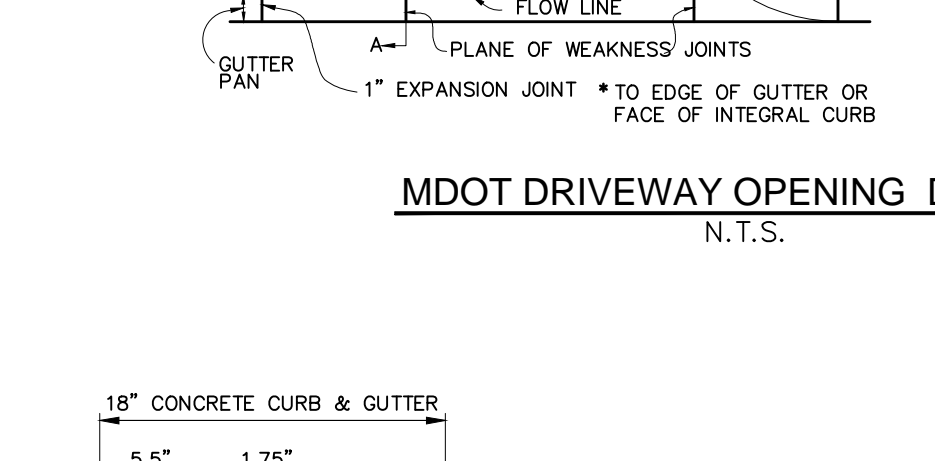
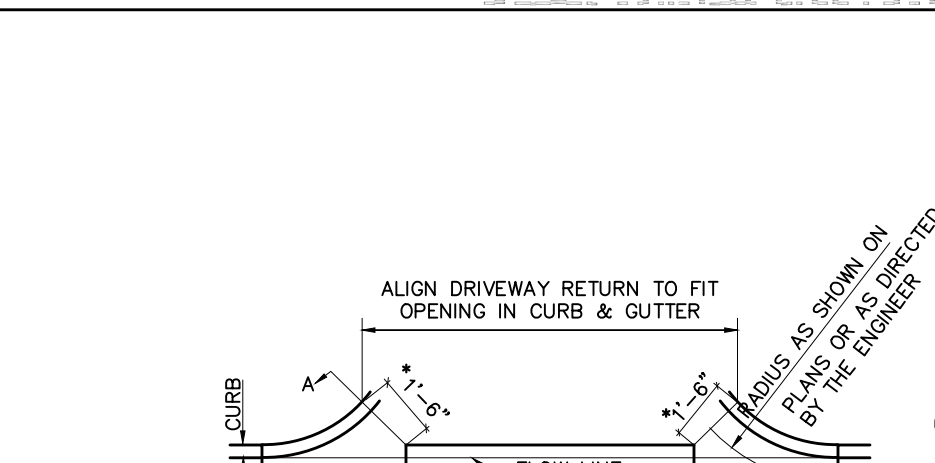
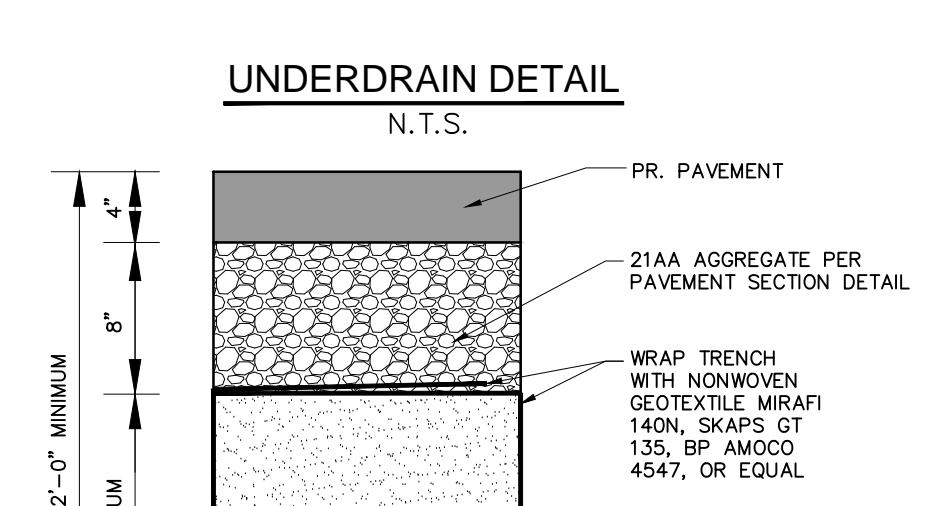
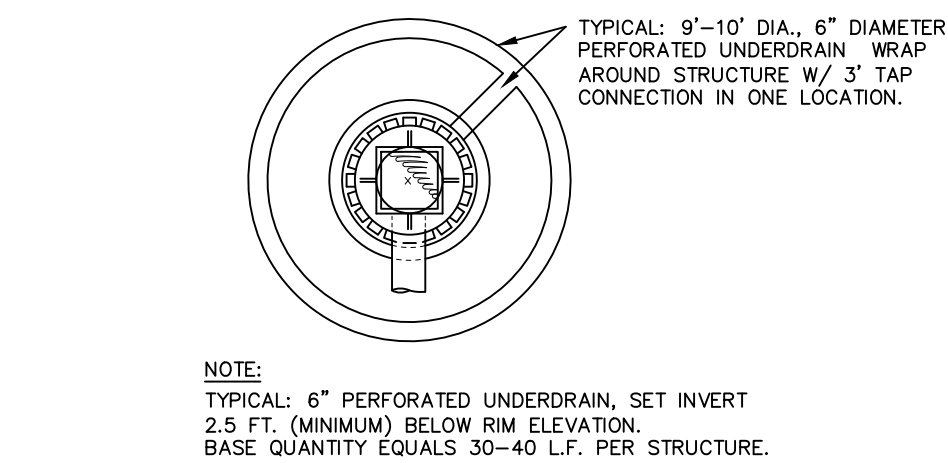
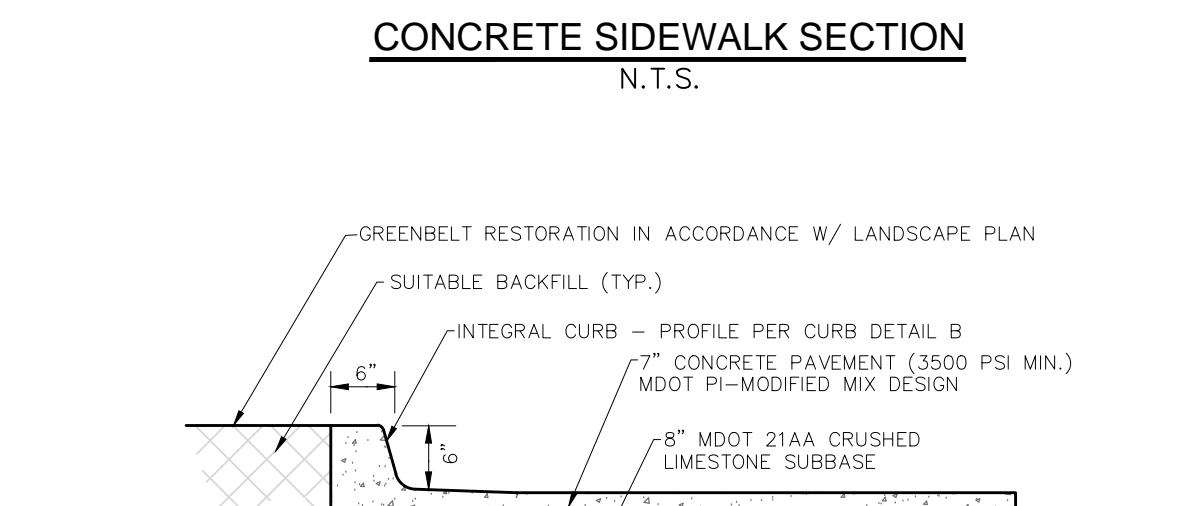
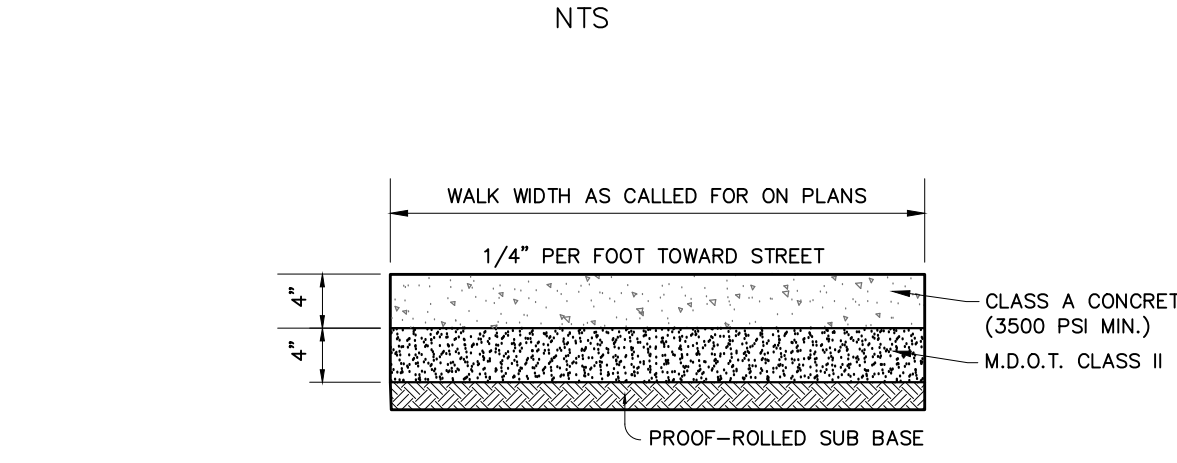
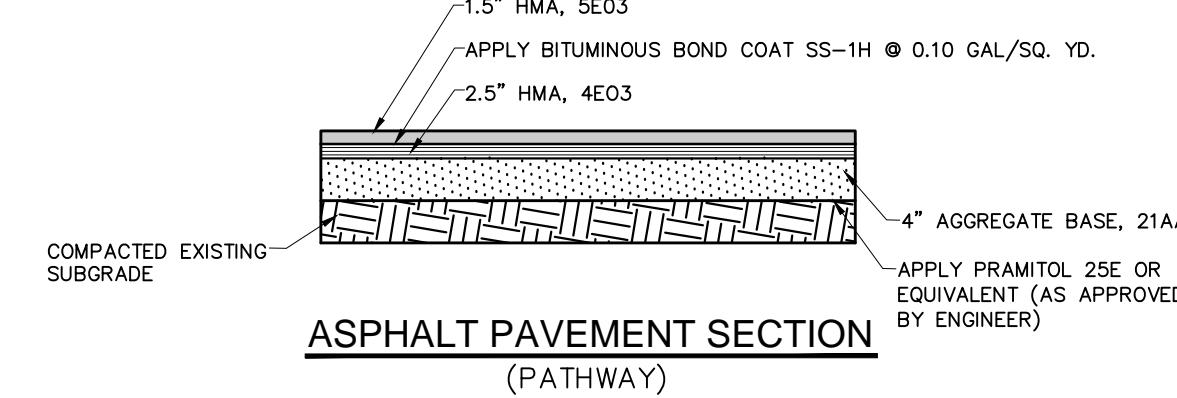
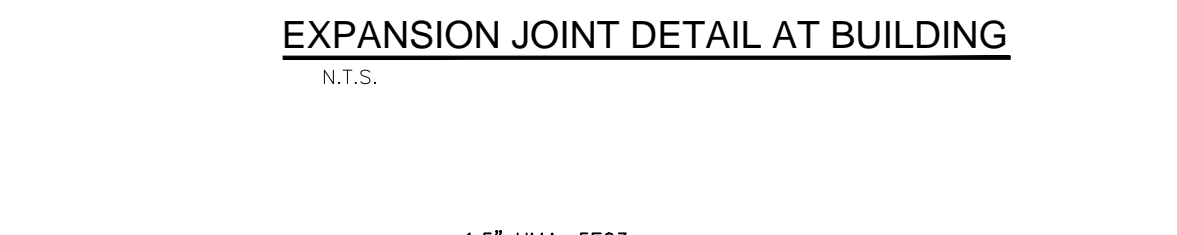
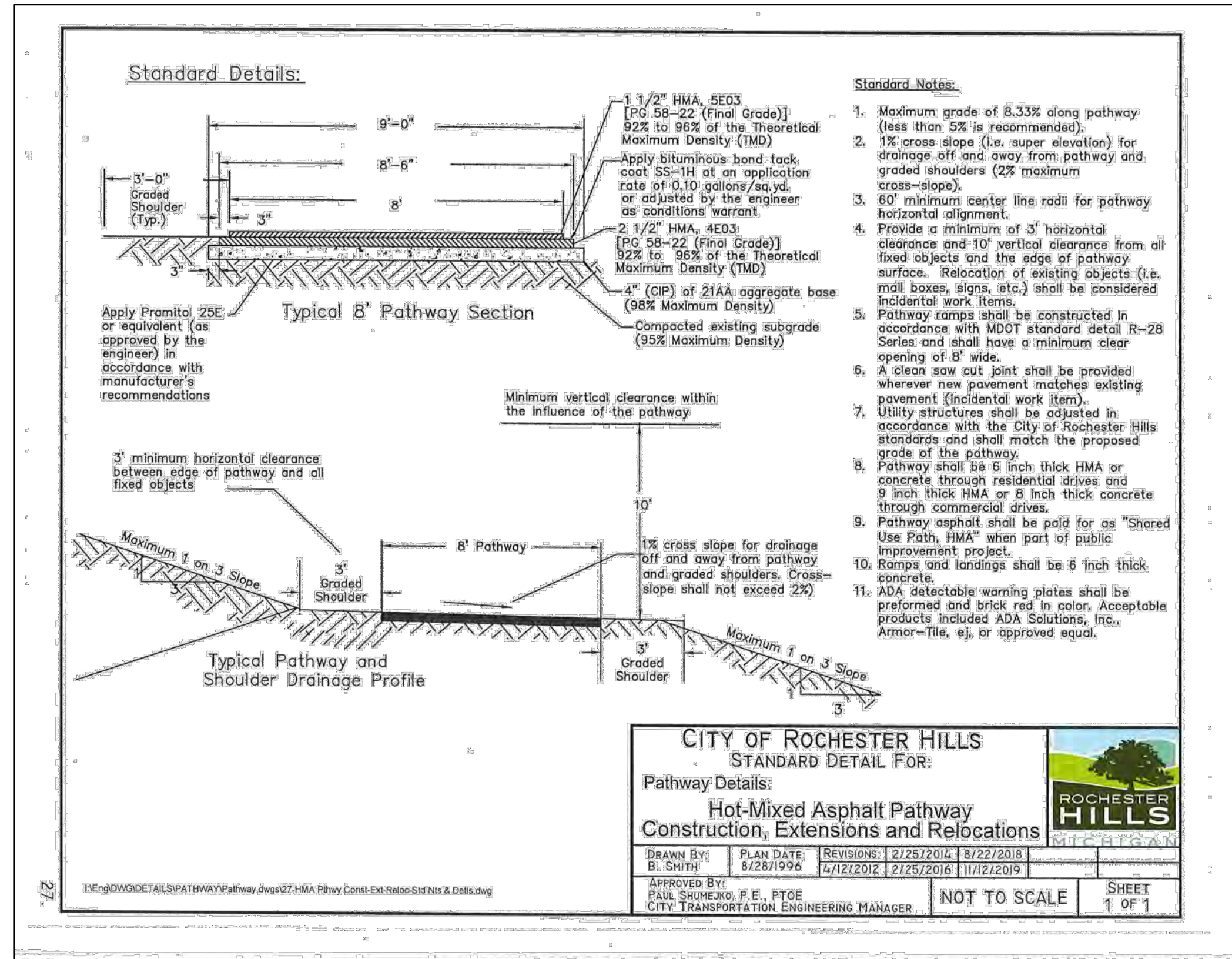
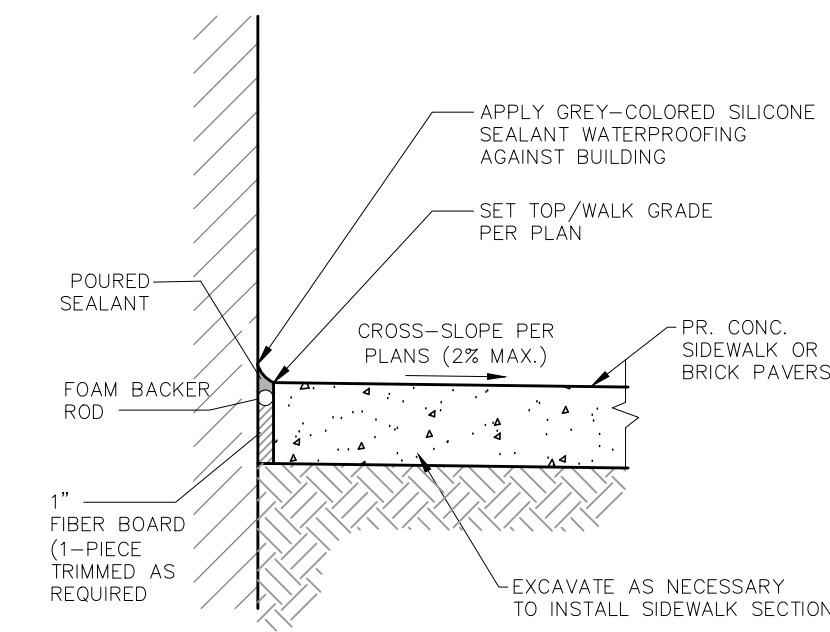
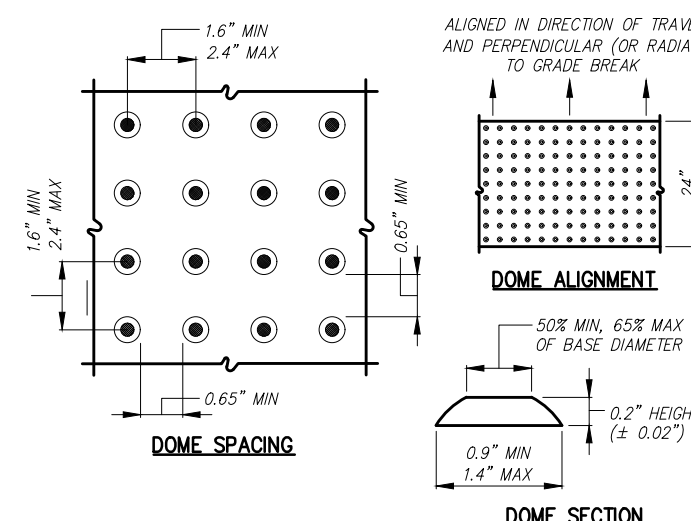
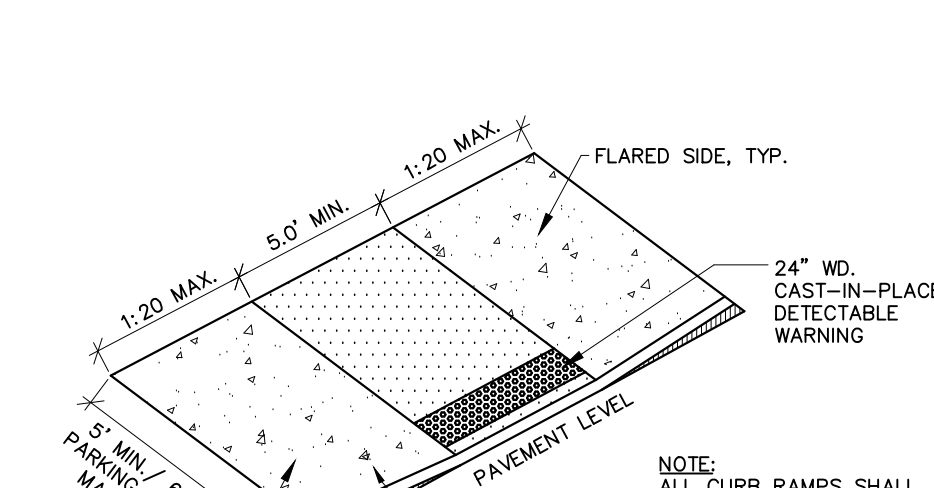
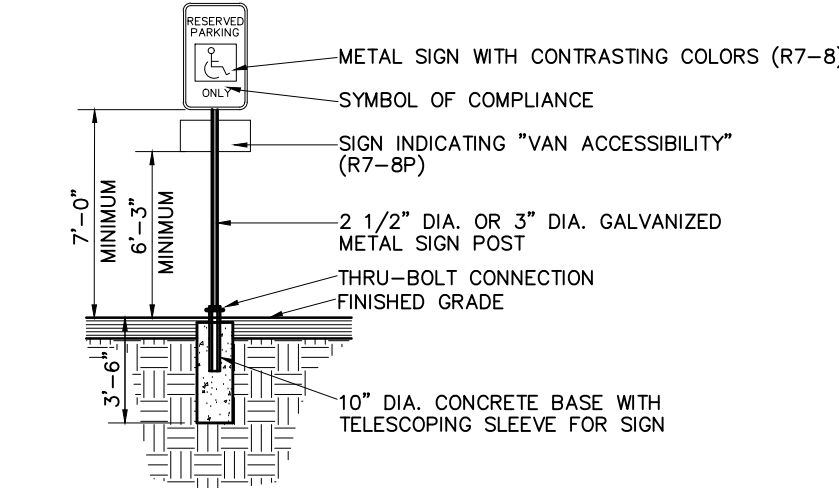
- THE IMPROVEMENTS COVERED BY THESE PLANS SHALL BE DONE IN ACCORDANCE WITH THE CITY OF ROCHESTER HILLS STANDARD DETAILS, SPECIFICATIONS, AND CODE OF ORDINANCE, THE CURRENT MICHIGAN DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR CONSTRUCTION (ENGLISH), OAKLAND COUNTY, MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY, AND THE 1998 MICHIGAN MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, EXCEPT WHERE OTHERWISE INDICATED ON THESE PLANS OR IN THE PROPOSAL, SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS.
- THE LOCATION OF ALL UTILITIES SHOWN ON THESE PLANS IS TAKEN FROM THE BEST AVAILABLE DATA. NOWAK AND FRAUS WILL NOT BE RESPONSIBLE FOR ANY OMISSIONS OR VARIATIONS FROM THE LOCATIONS SHOWN OR IN THE CASE OF UNFORESEEN EVENTS. AS A CONDITION OF THIS CONTRACT, NOTICE SHALL BE GIVEN TO MISS DIG FOR ANY UNDERGROUND WORK TO BE PERFORMED IN ACCORDANCE WITH THIS CONTRACT. THE CONTRACTOR SHALL NOTIFY MISS DIG AT 1-800-482-7171 A MINIMUM OF THREE WORKING DAYS PRIOR TO ANY EXCAVATION OR GRADING. THE CONTRACTOR SHALL VERIFY THE LOCATION & DEPTHS OF ALL UTILITIES PRIOR TO CONSTRUCTION.
- PUBLIC RIGHT OF WAYS SHALL NOT BE CLOSED WITHOUT THE WRITTEN APPROVAL OF THE CITY OR STATE. PERMITS MUST BE OBTAINED FROM THE CITY OF ROCHESTER HILLS, OAKLAND COUNTY, MDT AND MDO PRIOR TO THE COMMENCEMENT OF WORK. PROPER TEMPORARY SIGNING AND BARRICADING MUST BE ERCTED AND MAINTAINED TO INSURE SAFE TRAFFIC CONDITIONS ADJACENT TO WORK WITHIN PUBLIC RIGHTS OF WAY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING PERMITS, FILING ADVANCE NOTICE(S) AND MEETING ALL OTHER APPLICABLE PERMIT REQUIREMENTS.
- DUST CONTROL SHALL BE PROVIDED BY THE CONTRACTOR AT SUCH TIMES AS THE CITY/COUNTY/STATE INSPECTORS SHALL DIRECT. WATER AND/OR CHLORIDE USED AS A DUST CONTROL PALLIATIVE WILL NOT BE PAID FOR SEPARATELY, BUT SHALL BE CONSIDERED TO BE INCLUDED IN THE WORK OF THE ENTIRE PROJECT.
- THE CONTRACTOR SHALL VERIFY WITH THE CITY OR APPROPRIATE OWNER(S) OWNER'S REPRESENTATIVE, ALL SALVAGED OR REMOVED MATERIAL, DEBRIS OR ITEMS ORIGINATING FROM PRIVATE PROPERTY OR PUBLIC RIGHT OF WAYS, NOT TO BE USED AS PART OF THIS PROJECT AND NOT TO BE CLAIMED BY THE APPROPRIATE OWNER(S). SAID ITEMS SHALL INCLUDE BUT ARE NOT LIMITED TO DRAINAGE STRUCTURE COVERS, SIGNS, SIGN POLES, SIGN, ETC., SHALL BECOME THE PROPERTY OF THE CONTRACTOR, SHALL BE IMMEDIATELY HAULED OFFSITE AND LEGALLY DISPOSED OF AND SHALL NOT BE STORED WITHIN MUNICIPAL RIGHT OF WAYS.
- IN CONJUNCTION WITH THE PROPOSED SITE WORK, THE UTILITY COMPANIES AND/OR PUBLIC AGENCIES MAY BE RELOCATING OR REPLACING FACILITIES WHICH MAY OR MAY NOT BE SHOWN ON THE PLANS. THE CONTRACTOR WILL BE REQUIRED TO COORDINATE HIS OPERATION WITH THESE AND/OR OTHER UTILITIES, IF NECESSARY, TO NOT INCUR FURTHER COSTS TO THE OWNER.
- THE CONTRACTOR AND/OR SUBCONTRACTOR IS REQUIRED TO COOPERATE AND COORDINATE THEIR WORK WITH ALL WORK, IF ANY, BEING PERFORMED BY OTHERS.
- SAW CUTTING IS REQUIRED FOR THE REMOVAL OF PAVEMENT, SIDEWALK, CURB AND GUTTER, DRIVE APPROACHES, ETC. THE FIELD ENGINEER SHALL DETERMINE AND MARK IN THE FIELD THE APPROPRIATE REMOVAL OR SAWCUT LIMITS PRIOR TO CONSTRUCTION.
- IT IS THE INTENT THAT ALL GOVERNMENT CORNERS BE PRESERVED AND THAT, WHERE NECESSARY, MONUMENT BOXES BE SURVEYED AND WITNESSED, WHETHER SHOWN OR NOT, PRIOR TO REMOVAL OF SAID MONUMENTS. APPROPRIATELY RESET ALL MONUMENT CORNERS AND RESPECTIVE BOXES IN CONJUNCTION WITH CONSTRUCTION OPERATIONS.
- IN THE SPIRIT OF PROVIDING QUALITY PROJECT ASSURANCE, ALL RECOMMENDATIONS AND SUGGESTIONS POSED BY OTHER PROFESSIONAL DESIGN AND TESTING FIRMS INVOLVED WITH THIS PROJECT AND NOT TO BE FOUND IN THESE PLANS SHALL BE CONSIDERED AND DECIDED UPON BY THE OWNER AND CONTRACTOR.
- ADJUSTING EXISTING STORM DRAIN, SANITARY SEWER AND GATE VALVE STRUCTURE COVERS AS INDICATED IN THE PLANS SHALL INCLUDE REMOVING AND REPLACING THE CASTING/COVER, BLOCK, BRICK AND IF NEEDED, PRECAST SECTIONS TO OBTAIN THE DESIRED PROPOSED RIM ELEVATIONS. SET ALL RIM ELEVATIONS TO THE PROPOSED FINISHED GRADES AS INDICATED IN THE PLANS.

GENERAL PAVING NOTES:

- PROPOSED ASPHALT PAVEMENT LIFT THICKNESSES SHOWN ARE MINIMUM AND SHALL BE CONFIRMED WITH ON-SITE GEOTECHNICAL ENGINEER. REQUIRED ASPHALT PAVEMENT LIFT THICKNESS SHALL BE INCREASED FROM MINIMUM THICKNESS SHOWN BASED ON FIELD CONDITIONS.
- PAVEMENT SHALL BE OF THE TYPE, THICKNESS AND CROSS SECTION AS INDICATED ON THE PLANS AND AS FOLLOWS:
 CONCRETE:
 CONCRETE PAVEMENT SHALL MEET #1 MODIFIED MATERIAL SPECIFICATIONS, PORTLAND CEMENT TYPE IA (AIR-ENTRAINED) WITH A MINIMUM CEMENT CONTENT OF 5% SACK PER CUBIC YARD. MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 4500 PSI AND A SLUMP OF 1 1/2 TO 3 INCHES. CONCRETE WALKS & CURBS AND GUTTER SHALL MEET M.D.O.T. #1 MATERIAL SPECIFICATIONS.
 7-SACK HIGH-EARLY NOT ALLOWED UNLESS APPROVED BY OWNER.
 ALL CONCRETE PAVEMENT AND FLATWORK MIXES USED ON THIS PROJECT SHALL COMPLY WITH A MINIMUM GROUND GRANULATED BLAST-FURNACE SLAG (GGBS) SUBSTITUTION OF THIRTY-FIVE (35) PERCENT SUBJECT TO SEASONAL VARIATIONS PER THE MICHIGAN DEPARTMENT OF TRANSPORTATION (M.D.O.T.) STANDARD SPECIFICATIONS FOR CONSTRUCTION, 2012 EDITION.
 ASPHALT: ALL BITUMINOUS MIXES SHALL BE DESIGNED FOR 3 PERCENT AIR VIDS.
 LEVELING COURSE - M.D.O.T. 5E03
 SURFACE COURSE - M.D.O.T. 4E03
 ASPHALT BOND COAT SHALL MEET SS-1H AND/OR AN APPROVED EQUIVALENT APPLIED UNIFORMLY OVER THE SURFACE AT A RATE OF 0.10 GALLONS/SQ. YARD.
 ASPHALT BINDER - PG 64-22 (ALL BIT MIXES)
 COMPACT ALL ASPHALT COURSES TO A DENSITY OF 94% TO 97% OF THE MAXIMUM DENSITY AS DETERMINED BY THE RICE METHOD.
- AGGREGATE BASE COURSE SHALL BE COMPACTED TO 95% OF THE MAXIMUM DENSITY (MODIFIED PROCTOR) PRIOR TO PLACEMENT OF PROPOSED PAVEMENT, UNLESS OTHERWISE INDICATED. SAND SUB-BASE SHALL MEET M.D.O.T. CLASS II SPECIFICATIONS, AND SHALL BE COMPACTED TO 95% MAX. DENSITY.
- NO RAP ALLOWED IN TOP COURSES. RAP IN LEVELING & BASE COURSES SHALL BE LIMITED TO 30% AND OTHERWISE SHALL MEET M.D.O.T. STANDARDS.
- ALL CONCRETE PAVEMENT, DRIVEWAYS, CURB & GUTTER, ETC., SHALL BE SPRAY CURED WITH WHITE MEMBRANE CURING COMPOUND IMMEDIATELY FOLLOWING FINISHING OPERATION. DO NOT ALLOW FOR THIRTY (30) PERCENT REDUCED CURING STRENGTH.
- ALL CONCRETE PAVEMENT JOINTS SHALL BE FILLED WITH HOT POUR RUBBERIZED ASPHALT JOINT SEALING COMPOUND IMMEDIATELY AFTER SAWCUT OPERATION. FEDERAL SPECIFICATION SS-5164.
- ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH THE CURRENT STANDARDS AND SPECIFICATIONS OF THE CONTRACT.
- ALL TOP OF CURB ELEVATIONS, AS SHOWN ON THE PLANS, ARE CALCULATED FOR A 6" CONCRETE CURB UNLESS OTHERWISE NOTED.
- ALL SIDEWALK RAMPS, CONFORMING TO PUBLIC ACT NO. 8, 1973 AND I/C/A/S 1117.1-1998, SECTION 406, SHALL BE INSTALLED AS INDICATED ON THE PLANS.
- FOR ANY WORK WITHIN THE PUBLIC RIGHT-OF-WAY, THE CONTRACTOR SHALL PAY FOR AND SECURE ALL NECESSARY PERMITS AND LICENSES ARRANGE FOR ALL INSPECTION.
- EXISTING TOPSOIL, VEGETATION AND ORGANIC MATERIALS SHALL BE STRIPPED AND REMOVED FROM PROPOSED PAVEMENT AREA PRIOR TO PLACEMENT OF BASE MATERIALS, INCLUDING COMPLETE REMOVAL OF TREE ROOTS.
- EXPANSION & CONTRACTION JOINTS SHALL BE PLACED IN ACCORDANCE WITH INDUSTRY QUALITY STANDARDS.
- ALL PAVEMENT SUBGRADE AREAS SHALL BE PROOF-ROLLED (MAX. DEFLECTION 1/4") UNDER THE SUPERVISION OF A GEOTECHNICAL ENGINEER PRIOR TO THE PLACEMENT OF BASE MATERIALS.
- FILL AREAS SHALL BE MACHINE COMPACTED IN UNIFORM LIFTS NOT EXCEEDING 9 INCHES THICK TO 95% OF THE MAXIMUM DENSITY (MODIFIED PROCTOR) PRIOR TO PLACEMENT OF PROPOSED PAVEMENT.
- ALL STRUCTURES (MANHOLES, GATEWELLS, HYDRANTS, ETC.) WITHIN THE PROJECT LIMITS SHALL BE ADJUSTED TO THE FINISH GRADE.
- PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL COORDINATE ALL FOUNDATION ELEVATIONS WITH THE ARCHITECTURAL PLANS TO ENSURE PROPER CONSTRUCTION OF ALL WALKS, PAVEMENTS, CURBS, WALLS, ETC. TO ACHIEVE PROPOSED FINISHED GRADES.
- THE CONTRACTOR SHALL REQUEST WRITTEN CLARIFICATION FROM THE ENGINEER WELL IN ADVANCE OF CONSTRUCTION, SHOULD THERE BE ANY QUESTIONS.
- UNDER NO CIRCUMSTANCES SHOULD A SIDEWALK, WALKWAY, OR OTHER PAVED ROUTE BE CONSTRUCTED BENEATH AN ANGLED UTILITY POLE GUY ANCHOR CABLE. THE CONTRACTOR MUST COORDINATE RELOCATION OF GUY ANCHORS WITH THE UTILITY COMPANY OWNER PRIOR TO CONSTRUCTION.
- EXISTING ASPHALT TO BE OVERLID MUST BE PREPARED ACCORDING TO THE RECOMMENDATIONS OF THE GEOTECHNICAL ENGINEERING REPORTS AND FIELD TESTING ENGINEER PRIOR TO PAVING OVERLAYS AND WEDGE COURSES, INCLUDING CLEANING, SWEEPING, MILLING, CRACK FILLING, GRINDING, ETC.
- CONSTRUCTION TRAFFIC SHALL BE MINIMIZED ON EXPOSED SUBGRADES, AGGREGATE BASE COURSES, AND NEW PAVEMENTS. CONSULT WITH THE ON-SITE SOILS ENGINEER FOR REMEDIES CONCERNING TRAFFIC LOADING AND PREPARATIONS TO MINIMIZE DAMAGE TO THE PREPARED SURFACE AND SUBSURFACE.
- ON-SITE FILL CAN BE USED IF THE SPECIFIED COMPACTNESS REQUIREMENTS CAN BE ACHIEVED AND IS FREE OF FROZEN SOIL, ORGANICS OR OTHER DELETERIOUS MATERIALS. CONSULT WITH THE ON-SITE SOILS ENGINEER PRIOR TO USE OF MATERIALS AS DICTATED BY SITE CONDITIONS.
- REPAIR DISTRESSED PAVEMENT LEVELING AREAS PER THE RECOMMENDATIONS OF THE ON-SITE SOILS ENGINEER, PRIOR TO PLACING TOP COURSE.

STORM DRAIN, SANITARY SEWER, AND WATER MAIN NOTES:

- ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH THE CURRENT STANDARDS AND SPECIFICATIONS OF THE CITY OF ROCHESTER HILLS AND OAKLAND COUNTY, AS APPLICABLE. THE CITY OF ROCHESTER HILLS NOTES, DETAILS AND SPECIFICATIONS SHALL BE INCORPORATED AS PART OF THESE PLANS.
- ALL PIPE TRENCHES UNDER OR WITHIN A FIVE (5) FOOT INFLUENCE OF EXISTING OR PROPOSED BUILDING AND PAVEMENTS SHALL BE BACK FILLED WITH ENGINEERED FILL CONSISTING OF MDT CLASS II SAND AND BE MACHINE COMPACTED IN 8" TO 9" LIFTS TO A MINIMUM OF 95% OF THE MAXIMUM DENSITY UTILIZING ASTM 1557-T180 MODIFIED PROCTOR OR AS RECOMMENDED BY THE SOILS ENGINEER. PAVEMENTS SHALL INCLUDE PARKING LOTS, DRIVE APPROACHES, CURB & GUTTER AND ADJACENT WALKS.
- ALL STORM DRAIN AND SEWER PIPE SHALL BE INSTALLED ON CLASS "B" BEDDING OR BETTER. ALL STORM, SANITARY, AND WATER MAIN PIPE TRENCHES SHALL BE AS SHOWN ON STANDARD DETAIL SHEETS.
- STORM DRAIN AND SEWER SHALL BE OF THE TYPE, SIZE AND CLASS DESIGNATION AS INDICATED ON THE PLANS AND LIKEWISE BE INSTALLED AT THE PROPOSED LINE AND GRADE.
- ALL STORM DRAIN PIPE SHALL BE REINFORCED CONCRETE PIPE CONFORMING TO ASTM SPECIFICATION C-76 CL IV, UNLESS OTHERWISE INDICATED.
- AND WATER MAIN PIPE SHALL BE AS SHOWN AND IN ACCORDANCE WITH THE MUNICIPALITY STANDARDS.
- ALL MANHOLE, CATCH BASIN, AND GATE WELL COVERS/CASTINGS SHALL BE AS INDICATED IN THE PLANS IN ACCORDANCE WITH MUNICIPALITY STANDARDS.
- THE CONTRACTOR SHALL NOTIFY MISS DIG (1-800-482-7171) A MINIMUM OF THREE (3) WORKING DAYS PRIOR TO THE START OF CONSTRUCTION.
- EXACT GRADES AND INVERTS OF PROPOSED STORM DRAIN AND SEWER ARE TO BE CHECKED WITH THE FIELD ENGINEER PRIOR AND DURING INSTALLATION. THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE DESIGN ENGINEER OF ANY PLAN INCONSISTENCY AND/OR UTILITY CONFLICTS.
- ALL STORM DRAIN PIPE JOINTS SHALL BE "PREMIUM JOINT" MODIFIED GROOVED TONGUE (MGT) WITH SYNTHETIC RUBBER GASKETS CONFORMING TO ASTM SPECIFICATION C-443 AND C-361 UNLESS OTHERWISE INDICATED ON THE PLANS.
- FACILITY MANUFACTURED PRECAST TEE SECTIONS SHALL BE FOR ROOF DRAINS AND/OR SUMP PUMP LEADS AND LATERALS WHERE INDICATED ON THE PLANS. BLIND TAP CONNECTIONS INTO STORM SEWER WILL NOT BE PERMITTED BY BREAKING PIPEWALL.
- THE UNDERGROUND SITE CONTRACTOR SHALL INSTALL ALL STORM DRAIN AND SEWER BUILDING LEADS (IF REQUIRED) TO WITHIN FIVE (5) FEET OF PROPOSED BUILDING.
- UTILIZE FLOWABLE FILL IN AREAS AS RECOMMENDED BY THE GEOTECHNICAL ENGINEER.
- ASSURE PROPER COMPACTION AROUND ALL STORM DRAIN, SEWER, AND WATER MAIN PIPE, INCLUDING CROSSINGS WITH OTHER UTILITIES.
- ALL STORM DRAIN PIPE SIDEWALK TAPS SHALL BE DONE VERTICALLY CENTER TO CENTER OF PIPES, AND HORIZONTALLY IN THE MIDDLE OF A PIPE SECTION (TYPICAL CONCRETE PIPE SECTION IS 8" LONG). MAKE TAPS IN THE PRESENCE OF THE MUNICIPALITY'S INSPECTOR.
- INSTALL CONCRETE THRUST BLOCKS AT ALL BENDS AND HYDRANT TEES PER OAKLAND COUNTY STANDARD DETAILS.



NOWAK & FRAUS ENGINEERS
CIVIL ENGINEERS
LAND SURVEYORS
LAND PLANNERS

NOWAK & FRAUS ENGINEERS
46777 WOODWARD AVE.
PONTIAC, MI 48342-5032
TEL (248) 332-7931
FAX. (248) 332-8257

SEAL

PROJECT
North Row Development
Rochester Hills

CLIENT
North Row LLC
720 Kimberly Drive
Troy, MI 48098
Contact: Kevin Baird
Ph-248-709-2792

PROJECT LOCATION
Part of the SE 1/4
of Section 3
T. 3N., R. 11E.
City of Rochester Hills,
Oakland County, Michigan

SHEET
Notes and Details (1 of 3)



DATE ISSUED/REVISED
06-20-19 CIVIL S.P.A. - OWNER/ARCH. REVIEW
10-31-19 REVISED PER CITY & ARCH. COMMENTS
01-14-20 SITE PLAN APPROVAL
02-11-20 PC - SPA (REV. 1)
04-01-20 PC - SPA (REV. 2)
09-14-20 PC - REV. AMENITY SPACE PER EGLE
10-02-20 PC - SPA (REV. 3)

DRAWN BY:
P. Tulikangas
DESIGNED BY:
P. Tulikangas
APPROVED BY:
B. Buchholz
DATE:
02-09-2018
SCALE: N.T.S.

DATE	ISSUED/REVISED
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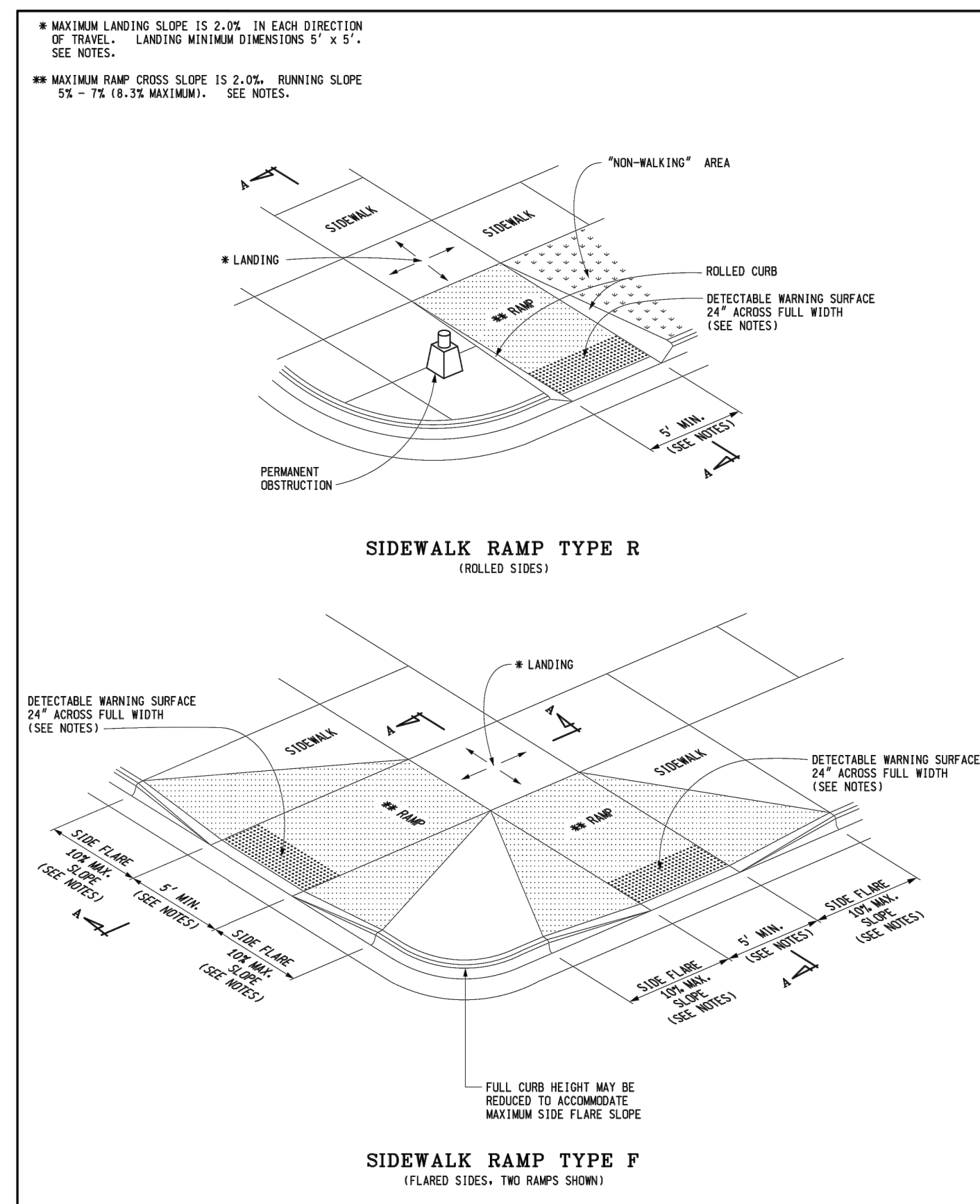
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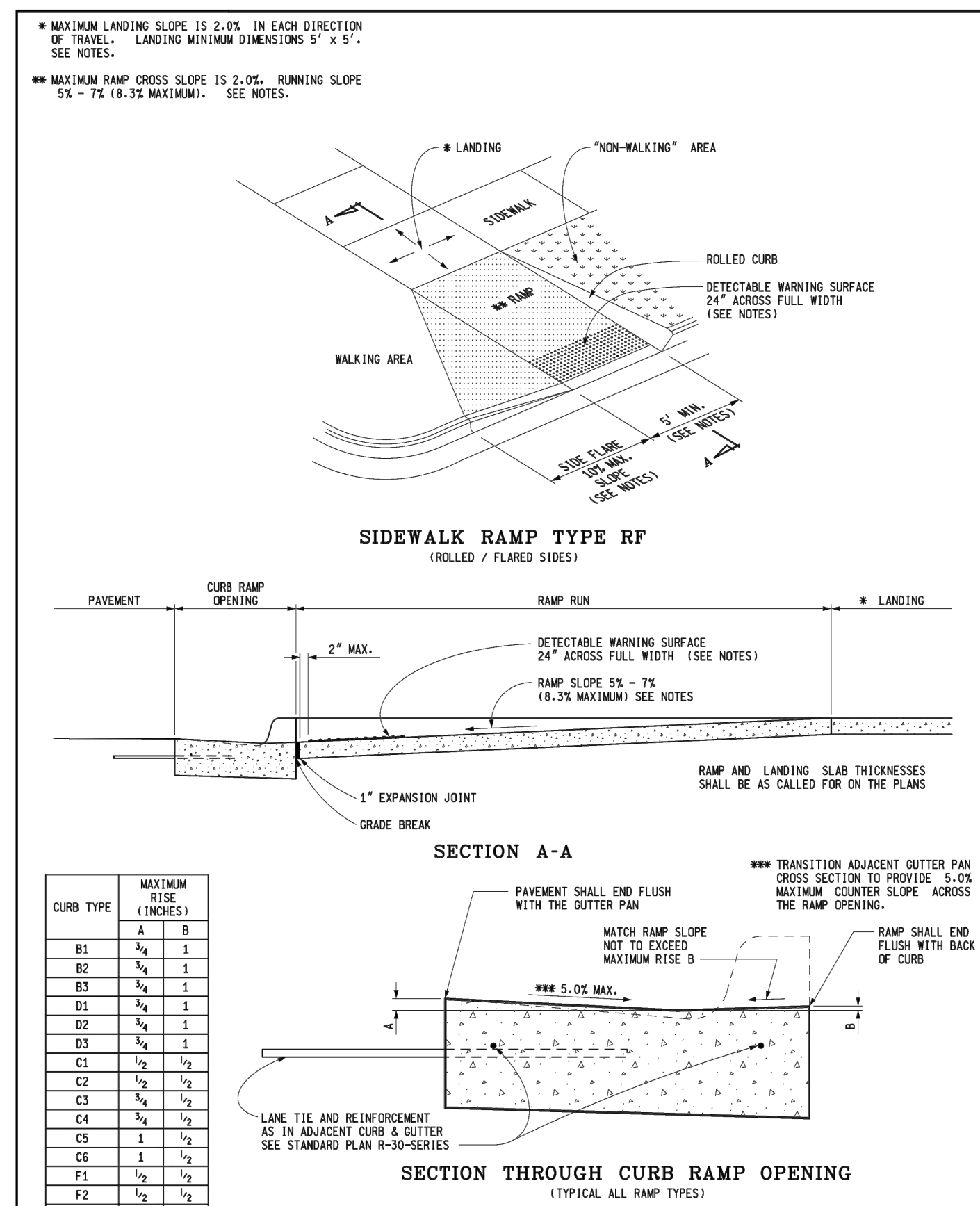
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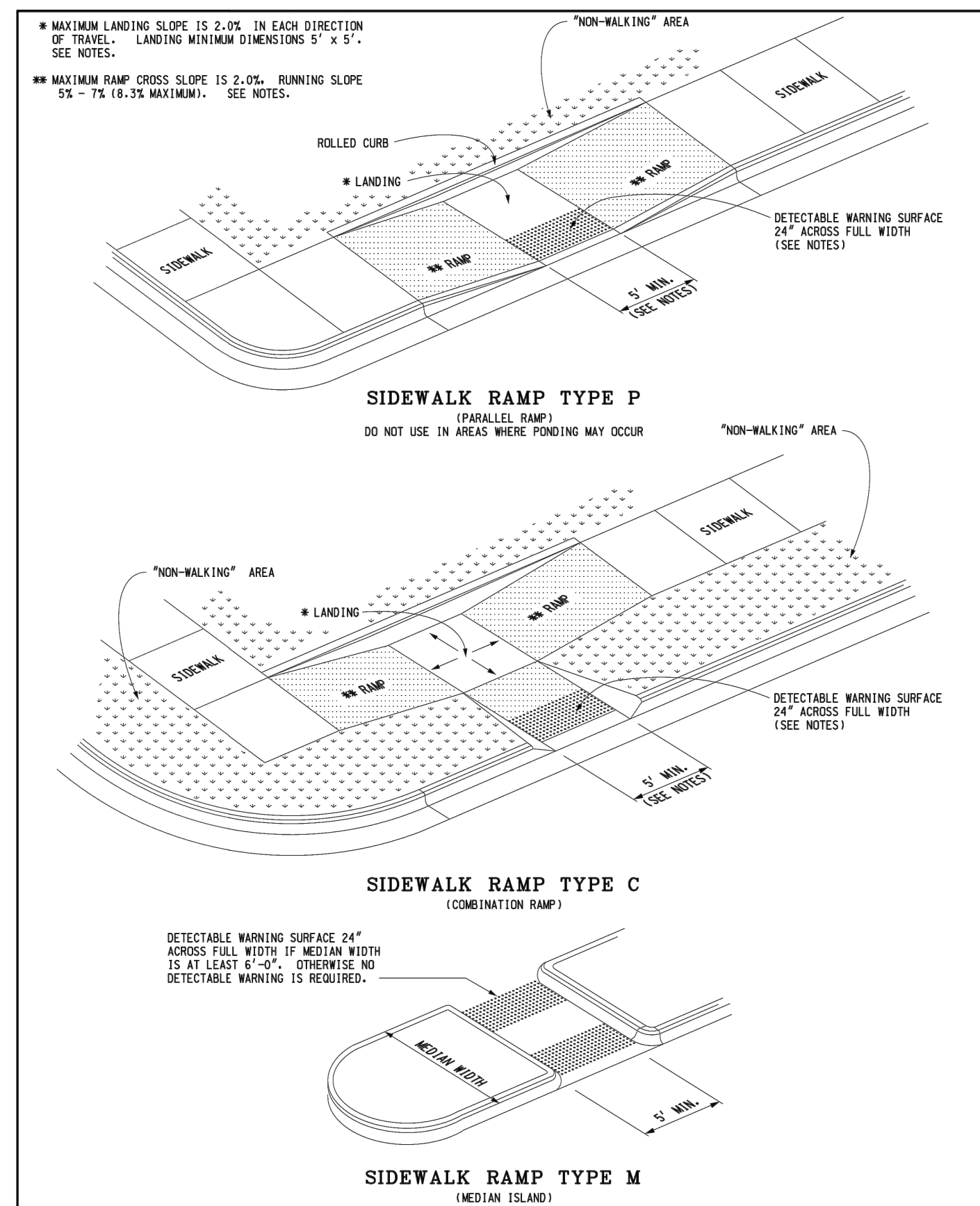
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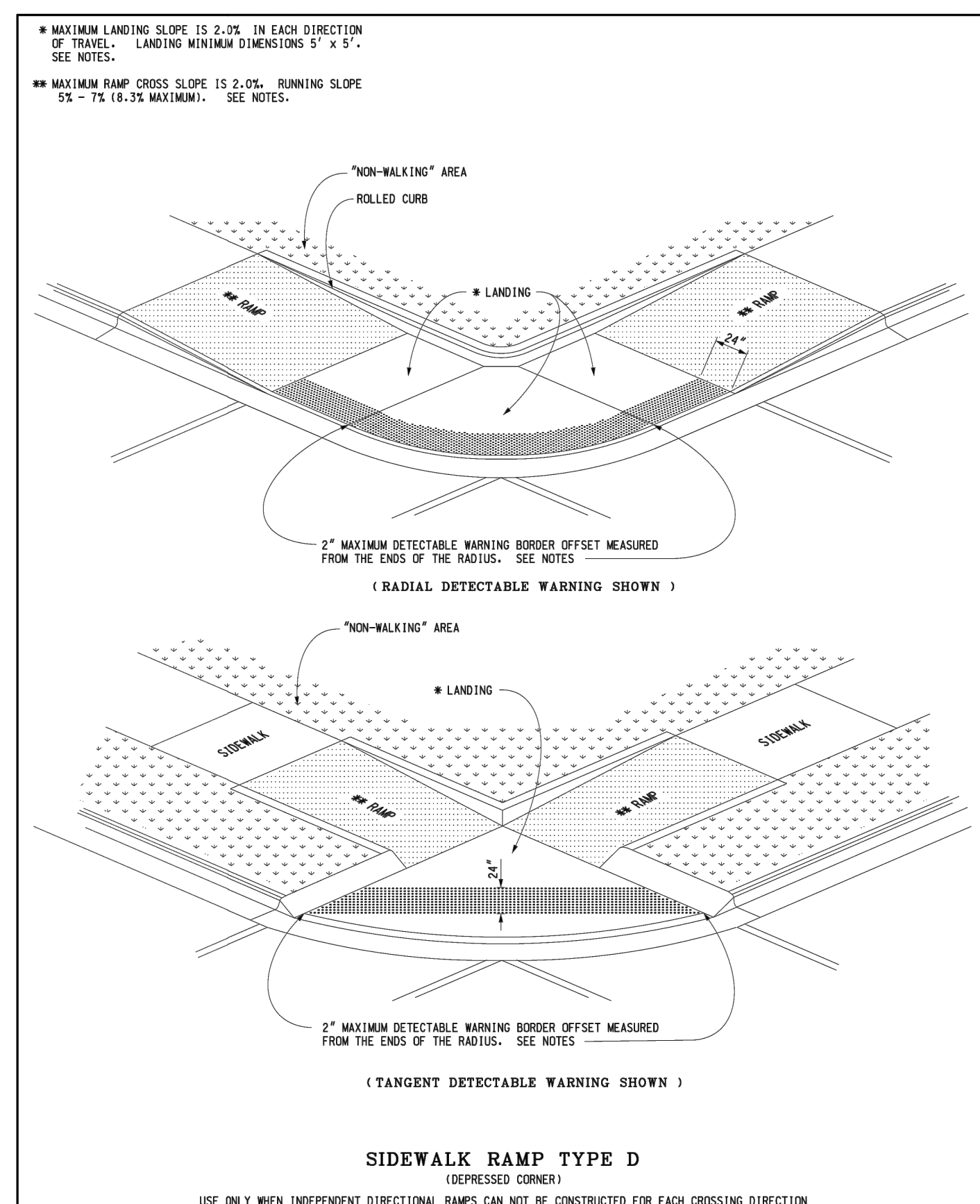
 PREPARED BY: DESIGN DIVISION DRAWN BY: B.L.L. CHECKED BY: M.A.P.	DEPARTMENT DIRECTOR Paul C. Argosha	MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT STANDARD PLAN FOR	SHEET 1 OF 7
	APPROVED BY: DIRECTOR, BUREAU OF FIELD SERVICES	SIDEWALK RAMP AND DETECTABLE WARNING DETAILS	
	APPROVED BY: DIRECTOR, BUREAU OF DEVELOPMENT	F.R.K.A. APPROVAL	7-26-2019 PLAN DATE



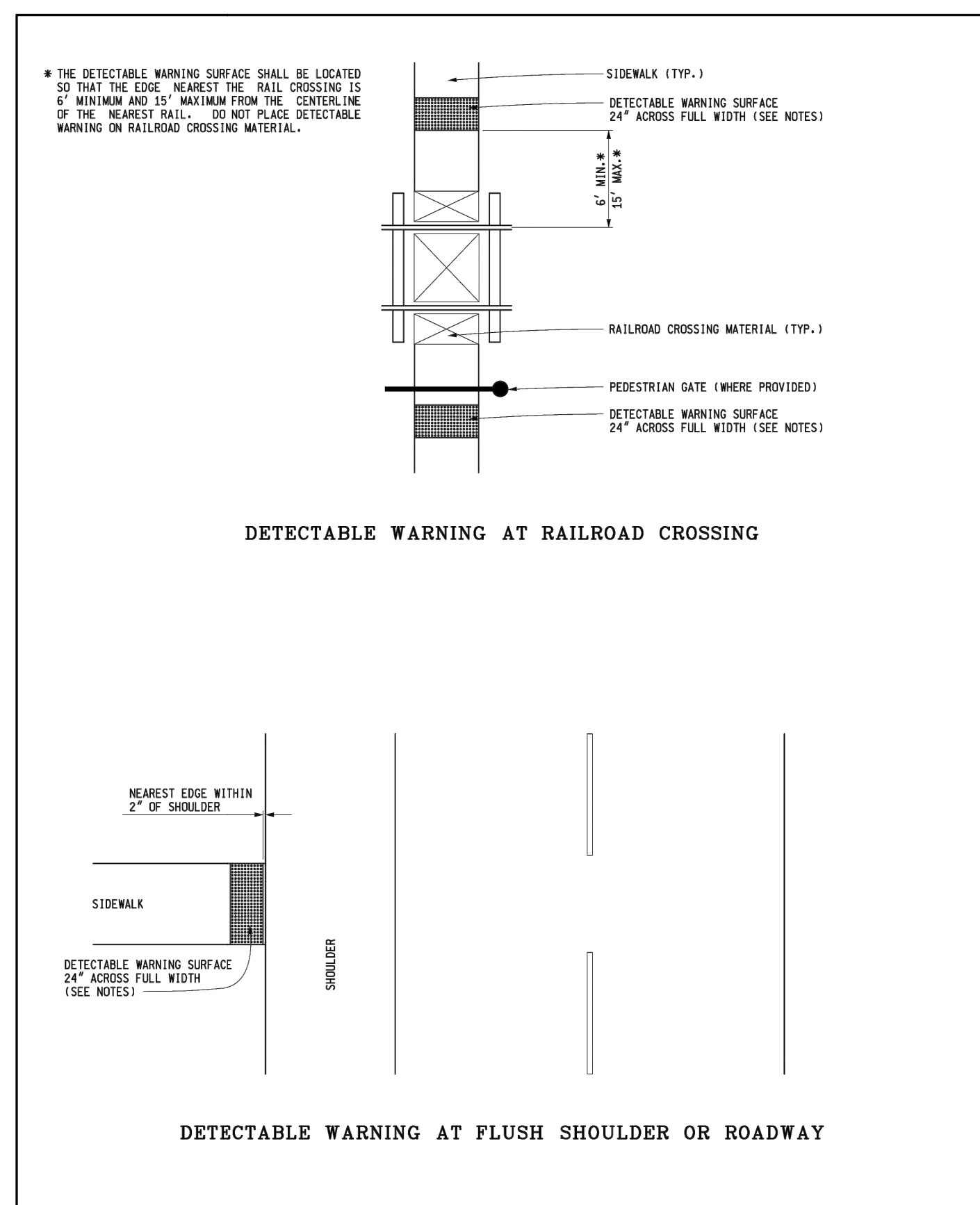
 PREPARED BY: DESIGN DIVISION DRAWN BY: B.L.L. CHECKED BY: M.A.P.	DEPARTMENT DIRECTOR Paul C. Argosha	MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT STANDARD PLAN FOR	SHEET 2 OF 7
	APPROVED BY: DIRECTOR, BUREAU OF FIELD SERVICES	SIDEWALK RAMP AND DETECTABLE WARNING DETAILS	
	APPROVED BY: DIRECTOR, BUREAU OF DEVELOPMENT	F.R.K.A. APPROVAL	7-26-2019 PLAN DATE



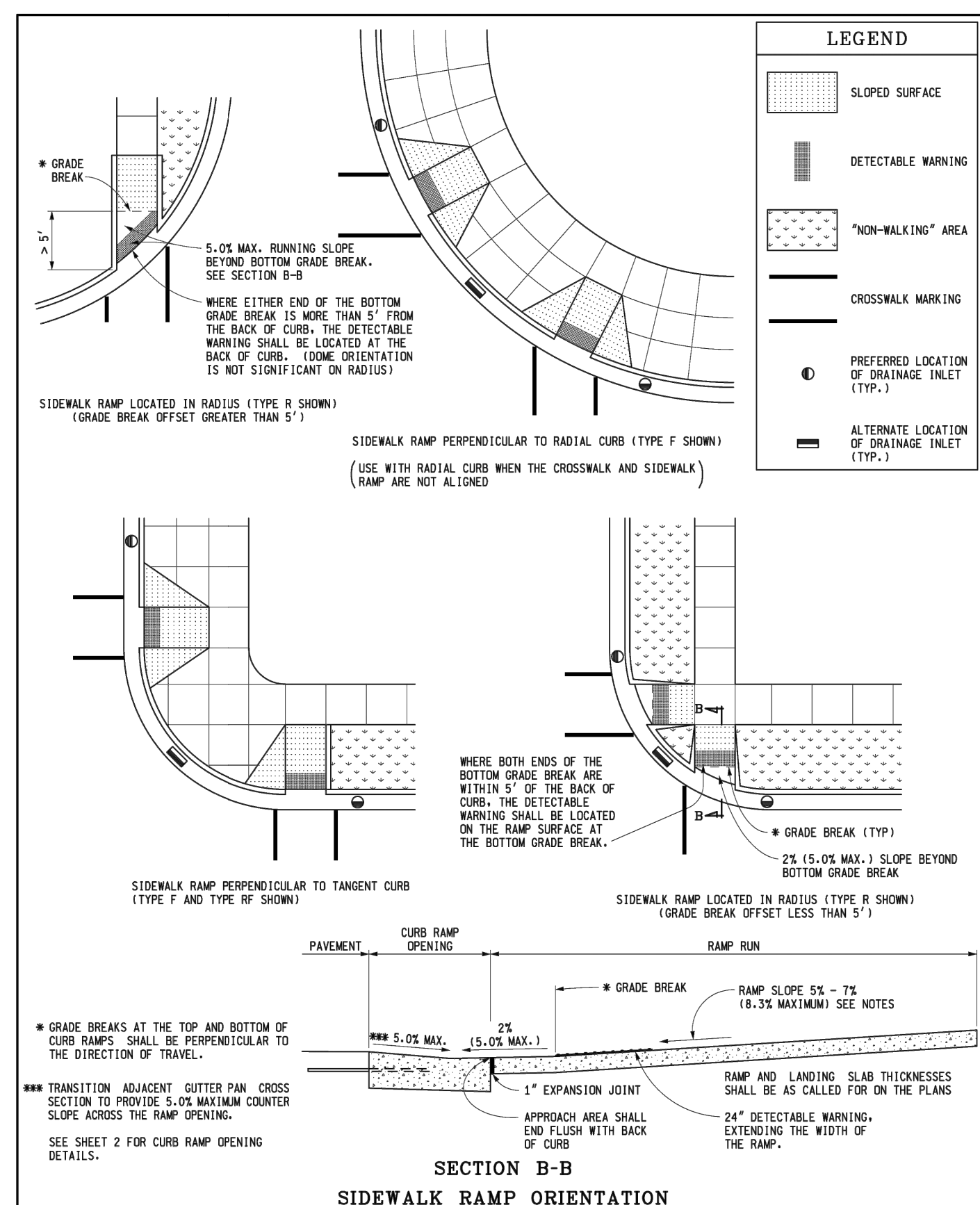
 PREPARED BY: DESIGN DIVISION DRAWN BY: B.L.L. CHECKED BY: M.A.P.	DEPARTMENT DIRECTOR Paul C. Argosha	MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT STANDARD PLAN FOR	SHEET 3 OF 7
	APPROVED BY: DIRECTOR, BUREAU OF FIELD SERVICES	SIDEWALK RAMP AND DETECTABLE WARNING DETAILS	
	APPROVED BY: DIRECTOR, BUREAU OF DEVELOPMENT	F.R.K.A. APPROVAL	7-26-2019 PLAN DATE



 PREPARED BY: DESIGN DIVISION DRAWN BY: B.L.L. CHECKED BY: M.A.P.	DEPARTMENT DIRECTOR Paul C. Argosha	MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT STANDARD PLAN FOR	SHEET 4 OF 7
	APPROVED BY: DIRECTOR, BUREAU OF FIELD SERVICES	SIDEWALK RAMP AND DETECTABLE WARNING DETAILS	
	APPROVED BY: DIRECTOR, BUREAU OF DEVELOPMENT	F.R.K.A. APPROVAL	7-26-2019 PLAN DATE



 PREPARED BY: DESIGN DIVISION DRAWN BY: B.L.L. CHECKED BY: M.A.P.	DEPARTMENT DIRECTOR Paul C. Argosha	MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT STANDARD PLAN FOR	SHEET 5 OF 7
	APPROVED BY: DIRECTOR, BUREAU OF FIELD SERVICES	SIDEWALK RAMP AND DETECTABLE WARNING DETAILS	
	APPROVED BY: DIRECTOR, BUREAU OF DEVELOPMENT	F.R.K.A. APPROVAL	7-26-2019 PLAN DATE



 PREPARED BY: DESIGN DIVISION DRAWN BY: B.L.L. CHECKED BY: M.A.P.	DEPARTMENT DIRECTOR Paul C. Argosha	MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT STANDARD PLAN FOR	SHEET 6 OF 7
	APPROVED BY: DIRECTOR, BUREAU OF FIELD SERVICES	SIDEWALK RAMP AND DETECTABLE WARNING DETAILS	
	APPROVED BY: DIRECTOR, BUREAU OF DEVELOPMENT	F.R.K.A. APPROVAL	7-26-2019 PLAN DATE



Know what's below
Call before you dig.

DATE	ISSUED/REVISED
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DATE:
02-09-2018

SCALE: N.T.S.

DOMES SECTION **DOMES SPACING** **DOMES ALIGNMENT**

DETECTABLE WARNING DETAILS

NOTES:
DETAILS SPECIFIED ON THIS PLAN APPLY TO ALL CONSTRUCTION, RECONSTRUCTION, OR ALTERATION OF STREETS, CURBS, OR SIDEWALKS IN THE PUBLIC RIGHT OF WAY.
SIDEWALK RAMP ARE TO BE LOCATED AS SPECIFIED ON THE PLANS OR AS DIRECTED BY THE ENGINEER.
RAMP SHALL BE PROVIDED AT ALL CORNERS OF AN INTERSECTION WHERE THERE IS EXISTING OR PROPOSED SIDEWALK AND CURB. RAMP SHALL ALSO BE PROVIDED AT MARKED AND/OR SIGNALIZED MID-BLOCK CROSSINGS.
DRAINAGE STRUCTURES SHOULD NOT BE PLACED IN LINE WITH RAMP. SURFACE TEXTURE OF THE RAMP SHALL BE THAT OBTAINED BY A COARSE BROOKING TRANSVERSE TO THE RUNNING SLOPE.
SIDEWALK SHALL BE RAMPED WHERE THE DRIVEWAY CURB IS EXTENDED ACROSS THE WALK.
CARE SHALL BE TAKEN TO ASSURE A UNIFORM GRADE ON THE RAMP. WHERE CONDITIONS PERMIT, IT IS DESIRABLE THAT THE SLOPE OF THE RAMP BE IN ONLY ONE DIRECTION, PARALLEL TO THE DIRECTION OF TRAVEL.
RAMP WIDTH SHALL BE INCREASED, IF NECESSARY, TO ACCOMMODATE SIDEWALK SHOW REMOVAL EQUIPMENT NORMALLY USED BY THE MUNICIPALITY.
WHEN 5' MINIMUM WIDTHS ARE NOT PRACTICABLE, RAMP WIDTH MAY BE REDUCED TO NOT LESS THAN 4' AND LANDINGS TO NOT LESS THAN 4' x 4'.
CURB RAMP WITH A RUNNING SLOPE 6% DO NOT REQUIRE A TOP LANDING. HOWEVER, ANY CONTINUOUS SIDEWALK OR PEDESTRIAN ROUTE CROSSING THROUGH OR INTERSECTING THE CURB RAMP MUST INDEPENDENTLY MAINTAIN A CROSS SLOPE NOT GREATER THAN 2% PERPENDICULAR TO ITS OWN DIRECTION(S) OF TRAVEL.
DETECTABLE WARNING SURFACE COVERAGE IS 24" MINIMUM IN THE DIRECTION OF RAMP/PATH TRAVEL AND THE FULL WIDTH OF THE RAMP/PATH OPENING EXCLUDING CURBED OR FLARED CURB TRANSITION AREAS. A BORDER OFFSET NOT GREATER THAN 2" MEASURED ALONG THE EDGE OF THE DETECTABLE MARKING IS ALLOWABLE. FOR RADIAL CURB THE OFFSET IS MEASURED FROM THE ENDS OF THE RADIUS.

FOR NEW ROADWAY CONSTRUCTION, THE RAMP CROSS SLOPE MAY NOT EXCEED 2.0%. FOR ALTERATIONS TO EXISTING ROADWAYS, THE CROSS SLOPE MAY BE TRANSFERRED TO MEET AN EXISTING ROADWAY GRADE. THE CROSS SLOPE TRANSITION SHALL BE APPLIED UNIFORMLY OVER THE FULL LENGTH OF THE RAMP.
THE MAXIMUM RUNNING SLOPE OF 6.3% IS RELATIVE TO A FLAT (0%) REFERENCE. HOWEVER, IT SHALL NOT REQUIRE ANY RAMP OR SERIES OF RAMP TO EXCEED 15 FEET IN LENGTH NOT INCLUDING LANDINGS OR TRANSITIONS.
DRAINAGE STRUCTURES SHOULD NOT BE PLACED IN LINE WITH RAMP. THE LOCATION OF THE RAMP SHOULD TAKE PRECEDENCE OVER THE LOCATION OF THE DRAINAGE STRUCTURE. WHERE EXISTING DRAINAGE STRUCTURES ARE LOCATED IN THE RAMP PATH OF TRAVEL, USE A MANUFACTURER'S ADA COMPLIANT GRATE. OPENINGS SHALL NOT BE GREATER THAN 1/2". ELONGATED OPENINGS SHALL BE PLACED SO THAT THE LONG DIMENSION IS PERPENDICULAR TO THE DOMINANT DIRECTION OF TRAVEL.
THE TOP OF THE JOINT FILLER FOR ALL RAMP TYPES SHALL BE FLUSH WITH THE ADJACENT CONCRETE.
CROSSWALK AND STOP LINE MARKINGS, IF USED, SHALL BE SO LOCATED AS TO STOP TRAFFIC SHORT OF RAMP CROSSINGS. SPECIFIC DETAILS FOR MARKING APPLICATIONS ARE GIVEN IN THE "MICHIGAN MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES".
FLARED SIDES WITH A SLOPE OF 10% MAXIMUM, MEASURED ALONG THE ROADSIDE CURB LINE, SHALL BE PROVIDED WHERE AN UNOBSTRUCTED CIRCULATION PATH LATERALLY CROSSES THE SIDEWALK RAMP. FLARED SIDES ARE NOT REQUIRED WHERE THE RAMP IS BORDERED BY LANDSCAPING, IMPAVED SURFACE OR PERMANENT FIXED OBJECTS, WHERE THEY ARE NOT REQUIRED, FLARED SIDES CAN BE CONSIDERED IN ORDER TO AVOID SHARP CURB RETURNS AT RAMP OPENINGS.
DETECTABLE WARNING PLATES MUST BE INSTALLED USING FABRICATED OR FIELD CAST UNITS CAST AND/OR ANCHORED IN THE PAVEMENT TO RESIST SHIFTING OR HEAVING.

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR
**SIDEWALK RAMP AND
DETECTABLE WARNING DETAILS**

7-26-2019 R-28-J SHEET 7 OF 7
F.H.W.A. APPROVAL PLAN DATE

LOCATION OF JOINTS IN CONCRETE SIDEWALK

TYPICAL SIDEWALK JOINT LAYOUTS

4" CONCRETE SIDEWALK

DEPARTMENT DIRECTOR
Kirk T. Staudt

PREPARED BY: *Randy U. Ryzny*
DESIGN DIVISION: DIRECTOR, BUREAU OF FIELD SERVICES
CHECKED BY: *Mark A. Van der Kolk*
APPROVED BY: DIRECTOR, BUREAU OF HIGHWAY DEVELOPMENT

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR
**DRIVEWAY OPENINGS
& APPROACHES,
AND CONCRETE SIDEWALK**

9-30-2014 7-1-2014 R-29-I SHEET 1 OF 4
F.H.W.A. APPROVAL PLAN DATE

CONCRETE DRIVEWAY OPENING LAYOUT

CONCRETE DRIVEWAY OPENING, DETAIL L

CONCRETE DRIVEWAY OPENING, DETAIL M

NOTES:
V = R - d
V = MINIMUM WIDTH OF THICKENED CONCRETE SIDEWALK.
R - d = 1' SHALL NOT BE LESS THAN DRIVEWAY WIDTH.
THE "R" DIMENSION IS SPECIFIED IN THE PUBLICATION "ADMINISTRATIVE RULES REGULATING DRIVEWAYS, BANNERS AND PARADES ON OR OVER HIGHWAYS".

FOR ROADWAYS WITH CONCRETE PAVEMENTS, LONGITUDINAL LANE TIES WILL BE CONTINUOUS THROUGH THE DRIVEWAY OPENING AND THE SPACING OF THE REINFORCING BARS IN CONCRETE DRIVEWAYS SHALL BE ADJUSTED TO AVOID CONFLICT WITH THE LONGITUDINAL LANE TIES.

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F.H.W.A. APPROVAL PLAN DATE

HMA DRIVEWAY APPROACH
(TO BE USED WITH DETAIL L)

CONCRETE DRIVEWAY APPROACH
(TO BE USED WITH DETAIL L OR M)

THICKENED CONCRETE SIDEWALK

REINFORCEMENT FOR CONCRETE DRIVEWAYS

CONCRETE DRIVEWAY THICKNESS	WIRE SIZE (6" x 6" MESH)	AVERAGE WEIGHT (LBS./SQ. FT)
LESS THAN 8"	W1.4	21
8" OR GREATER	W2.0	42

NOTE: USE WIRE FABRIC REINFORCEMENT SPECIFIED ON STANDARD PLAN R-31-SERIES.

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7-1-2014 R-29-I SHEET 3 OF 4
F.H.W.A. APPROVAL PLAN DATE

LOW VOLUME COMMERCIAL OR RESIDENTIAL DRIVEWAY SLOPES

COMMERCIAL DRIVEWAY PROFILE FOR MAJOR TRAFFIC GENERATORS

NOTES:
FOR DRIVEWAY DESIGN REFER ALSO TO "ADMINISTRATIVE RULES REGULATING DRIVEWAYS, BANNERS, AND PARADES ON OR OVER HIGHWAYS" AND GEOMETRIC DESIGN 9-480-SERIES, COMMERCIAL DRIVEWAYS.
FOR CURB AND GUTTER DETAILS, SEE STANDARD PLAN R-30-SERIES.
TRANSVERSE SIDEWALK SLOPES ARE TYPICALLY 1.5% (2.0% MAXIMUM). IN ORDER TO MEET SITE CONDITIONS, IF THE TRANSVERSE SLOPE IS REQUIRED TO BE LESS THAN 1.5%, LONGITUDINAL DRAINAGE MUST BE PROVIDED.
WHEN SETTING GRADES FOR COMMERCIAL DRIVES, THE TYPES OF VEHICLES USING THE DRIVE SHOULD BE CONSIDERED.

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9-30-2014 7-1-2014 R-29-I SHEET 4 OF 4
F.H.W.A. APPROVAL PLAN DATE